

SMITHSONIAN INSTITUTION.
UNITED STATES NATIONAL MUSEUM.

REVISION OF THE ORTHOPTERAN GROUP MELANOPLI (ACRIDIIDÆ), WITH SPECIAL REFERENCE TO NORTH AMERICAN FORMS.

BY

W

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REVISION OF THE ORTHOPTERAN GROUP MELANOPLI
(ACRIDIIDAE), WITH SPECIAL REFERENCE TO NORTH
AMERICAN FORMS.

By SAMUEL HUBBARD SCUDDER.

INTRODUCTION.

THE PRESENT ESSAY describes in detail and discusses the classification of a group of grasshoppers which forms the prevailing type of orthopteran life throughout North America—the common short-horned grasshoppers one sees every summer day. Its best known representative to the world at large is the destructive migratory locust of the West, the so-called “Rocky Mountain Locust.” The outbreak of this insect has been at times extremely disastrous; so much so that a Government commission was for several years in existence, which published nearly twenty years ago two voluminous reports in which it and one or two of its immediate allies were studied with a minuteness and thoroughness, and illustrated with a fullness very rarely given to any such insignificant looking creature.

This destructive insect has numerous closely related allies in all parts of the United States, many of which often abound to such an extent as to do serious damage to crops, and a few of them have been known to migrate in similar fashion (though over a far more restricted area), so that they have sometimes been mistaken by the uninstructed for that destructive pest.

The group is almost confined to North America, and a great many species have been described by various writers in a more or less desultory manner. It is the aim of the present paper to enlarge and systematize our knowledge of this important group as a basis for future studies. No group of North American Orthoptera has been in greater need of revision.

Characteristics and limitations.—Stated as briefly as possible, the Melanopli are Acridians in which the antennae are longer than the fore femora, which have no foveolae on the vertex, the fastigium more or less deflexed, passing insensibly into the frontal costa, the prosternum mucronate, no sharp and distinct lateral carinae (or they are rarely present), an arolium on all the tarsi, the hind tibiae with smooth margins, provided with 9-14 (by rare exception 8) spines regularly disposed in the outer series, which lacks an apical representative, and the second hind tarsal joint only half as long as the first.

To state their characters more in detail, the Melanopli may be described as Acridians, generally of small or medium size, never very large, in which the head is not greatly exserted and the face is moderately oblique or subvertical; the antennae are linear, longer than the fore femora; the eyes are of moderate size, not very strongly prominent, never twice as long as the infraocular portion of the genae, the interspace between them very rarely broad, generally narrow; the fastigium is more or less declivent, never greatly produced in the axis of the body, apically entire and with no transverse ruga, passing insensibly and with obtuse arcuation into the frontal costa; the latter is hardly rounded as seen from the side, percurrent or subpercurrent, generally sulcate, the sulcation ordinarily confined to the lower portion; without foveolae, the tempora small, obliquely declivent, confused with the front; the superior ocelli more distant than the antennal scrobes; the lateral carinae of the face nearly equidistant from the lateral margins of the frontal costa, but slightly divergent inferiorly. The dorsum of the pronotum is nearly plane and without a crest, generally with no distinct lateral carinae, but at most with rounded shoulders or feeble rugae to represent them, but often passing insensibly into the lateral lobes; the principal sulcus is continuous; the prozona is generally smooth or obsoletely punctate, never tuberculate, its sulci generally feebly impressed, often mesially interrupted or subinterrupted, the posterior sulcus often distinctly divergent laterally from the principal sulcus; the metazona is generally shorter than the prozona and lies in the same or nearly the same plane with it, almost always densely punctate; the lateral lobes are truncate or subtruncate posteriorly, with no humeral sinus or only a feeble one, the posterior lower angle distinctly obtuse. The prosternum is armed with a spine which is usually rather prominent and conical, sometimes truncate, never sinuate, generally vertical on the posterior face, nearly or quite as high as the anterior coxae, the posterior portion of the prosternum not or but slightly tumescent; the mesosternal lobes are quadrate or transverse, separated more or less widely, the apical inner angle rectangulate or obtusangulate, generally rounded (often obtusely), the inner margins generally rounded, often posteriorly divergent; the metasternal lobes are contiguous or not very distant excepting sometimes in the female and then rarely as distant or even nearly as distant as

the mesosternal lobes. The tegmina are frequently abbreviate or even wanting; when fully developed, they taper gently almost throughout and are rather remotely reticulate at least in their apical half, the cells of the postradial area wholly or partially biseriolate in arrangement on either side of an intercalary vein; the wings are almost always clear and uniform, never definitely pictured, the veins never scalariform, the areolae quadrate or longer than broad. All the tarsi are furnished with an arolium, the front legs are less distantly separated than the hind pair, the fore tarsi are of moderate length, the first joint short or rather short; the hind femora are distinctly incrassate basally, generally surpass the abdomen, the upper face generally smooth, the dorsal carina entire, unarmed, not profoundly excised before the geniculation; the hind tibiae have smooth lateral margins, the spines of the outer and inner series are equal or subequal in length, those of the outer series typically nine¹ or more in number, rarely exceeding fourteen, placed at subequal distances apart and lacking an apical spine next the calcaria; the hind tibiae have the first joint not compressed, equal to or slightly longer than the third, the second much shorter, generally a half shorter, than the first as seen from above. The second dorsal segment of the abdomen is neither granulate nor dentate at the anterior angles, the extremity of the abdomen in the male generally more or less clavate and recurved, the supraanal plate not tuberculate, with a basal median sulcus, a furcula usually present, the cerci very variable, rarely longer than the supraanal plate, straight or gently curved, never abruptly recurved basally, generally compressed at least in part, often laminate, but with no indirected median spine.

The foundation for our present knowledge of the structural features of the Melanopli was laid by Stål² and enlarged in his *Systema Acricodeorum* (1878) and his *Observations Orthoptérologiques*, III (1878). In its present form the group was first defined and named by Brunner von Wattenwyl,³ who applied to it the term PEZOTETTIGES. I have here limited it strictly in the same manner, but it will appear that it contains a very much larger number of generic types than were credited to it by Brunner and a vast multitude of species. I shall moreover show below, when treating the genus *Podisma*,⁴ that the generic term *Pezotettix*, from which Brunner derived the name of the group, has been misapplied of recent years, and should be referred to the group called *Platyphymata* in Brunner's *Révision*. I have accordingly here named the present group MELANOPLI after its predominant genus *Melanoplus*, the species of which far outnumber all the others combined. Giglio-Tos in recent papers has described several new genera and

¹ By exception, in one sex or on one side of the body, there may be only eight.

² *Recensio Orthopterorum*, I (1873).

³ *Révision du Système des Orthoptères* (1893).

⁴ See also *Psyche*, VII, pp. 195-196.

species from South America; but in the present paper full consideration will be given only to the North American species; a table will, however, be added for the determination of the Old World species in their place, and the South American forms will be merely tabulated at the close.

Geographical distribution.—The Melanopli are an almost exclusively American group; a single genus, *Podisma*, is represented in the Old World (and more abundantly than in the New) north of 35° north latitude. With that exception almost all the genera and species are confined to North America. South America possesses four genera (not included in the present paper)—*Dichroplus*, *Scotussa*, *Scopas*, and *Atrachelueris*, with about twenty known species mostly referred to *Dichroplus*, besides *Paradichroplus*, with four species in Paraguay. The remaining genera are exclusively North American, but eleven of them—*Netrosoma*, *Phaedrotettix*, *Conalcaea*, *Barytettix*, *Phaulotettix*, *Cephalotettix*, *Rhabdotettix*, *Cyclocercus*, *Sinaloa*, *Aidemona*, and *Philocleon*, with nineteen species, besides two species of the South American genus *Paradichroplus*, are found exclusively in Central America and Mexico, or only pass the borders of the United States narrowly.

All of these Central and South American genera (with the single exception of *Philocleon*) belong to the division of Melanopli in which the lateral margins of the subgenital plate of the male are not at all ampliate at the base; and they comprise all but three of the genera belonging to that section, these three being *Gymnoscirtetes* with one species in Florida, *Hypochlora* with one species from the Canadian border to Kansas and Colorado, and *Campylacantha* with four species, three ranging from Nebraska to Texas and one found in Mexico. The great bulk of the species and most of the genera (including all but one—*Philocleon*—of those belonging in the section with ampliate basal margins to the subgenital plate) are confined to the United States and Canada, where they form one of the dominant types of Acridiidae.

This division, that with ampliate basal margins, is represented (apart from *Philocleon* with its single species) by fourteen genera and one hundred and seventy-nine species, of which only four genera occur south of our border, with thirteen species confined to Mexico, and twelve others found both in Mexico and the United States; leaving ten genera wholly, and four others almost wholly, belonging to the more northern region, with one hundred and sixty-six species. No species of either division are found in the Antilles.

With trifling exceptions, then, the division with nonampliate basal margins to the subgenital plate is characteristic of Central and South America—or subtropical and tropical America—while the other division, vastly more important, is characteristically temperate North American, with one outlier in temperate Europe-Asia.

The dominant genus is *Melanoplus* with one hundred and thirty-one species described in the present paper; a number more are known to

me, but insufficiently. *Podisma* follows, with about twenty-four species, of which only eight are found in America, then *Aeoloplus* with ten, *Hesperotettix* with eight, and *Bradynotes* with seven. The remaining genera have at the most only three or four species each, and fourteen of them are monotypic.

The genera with widest latitudinal range (over twenty degrees) are, primarily, *Melanoplus*, and then *Hesperotettix* (eight species), *Phoetaliotes* (one species), *Oedaleonotus* (one species), *Campylacantha* (four species), and probably *Podisma* (eight species). *Aeoloplus* (ten species) follows hard after. The genera characteristic of the United States, with narrowest known limits, are *Gymnoscirtetes* and *Eotettix*, both known only from Florida. These last two, with *Paroxya* and *Aptenopedes*, are the only genera (with eight species between them) confined to the eastern United States, if Texas may be included in that term, for they do not extend west of that. Most of the genera are western, using that term in a broad sense, though *Hypochlora*, *Campylacantha*, *Dendrotettix*, *Paratytiotropidia*, and *Phoetaliotes*—all but *Campylacantha* monotypic genera—are peculiar to the Mississippi Valley, though principally to its western half. The only genera found across or almost across the continent, or at all events on opposite sides of the continent, are *Melanoplus*, *Hesperotettix*, and *Podisma*. *Aeoloplus* (ten species), *Bradynotes* (seven species), *Pocillotettix* (three species), *Oedaleonotus* (one species), and *Asemoplus* (one species) are characteristic of the extreme West. Finally, *Hypochlora* (one species), *Bradynotes* (seven species), *Podisma* (eight species), and *Asemoplus* (one species) are confined or nearly confined to the region north of latitude 35°. *Podisma* has also the same limitations in the Old World. Regarding the distribution of *Melanoplus*, with its great preponderance of forms, further details will be given under that genus.

There are but few species which range across the continent, yet not a few have a very wide distribution. The examples of the former are wholly confined to *Melanoplus*: *M. atlansis*, *fasciatus*, *femur-rubrum*, *extremus*, *minor*, and *femoratus*, *M. extremus* only in the high north. As illustrations of the latter may be mentioned *Hesperotettix pratensis*, *Phoetaliotes nebrascensis*, *Paroxya floridana*, *Oedaleonotus enigma*, and the following species of *Melanoplus*: *flabellifer*, *spretus*, *scudderi*, *dawsoni*, *cinereus*, *packardii*, *luridus*, *differentialis*, *bivittatus*, and *punctulatus*. Most of these range more widely from north to south than from east to west. About three fourths of all the species are known from west of the Mississippi River only.

Dimorphism in length of tegmina.—We find in the Melanopli every variation possible in the length of the tegmina, but the species are in general tolerably well fixed in this respect. The same is the case with most of the genera, the species of which are in each case generally apterous, provided with lateral pads, abbreviated tegmina, or fully

developed tegmina, as the case may be; but all the larger genera (excepting *Bradynotes*) and some of the smaller show considerable diversity in this respect; the greatest difference between different members of the same genus obtains in the two largest genera: *Melanoplus*, where the species may range from those with merely lateral pads to those with tegmina far surpassing the hind femora; and *Podisma*, where they range from apterous species to those with tegmina half as long as the abdomen. But this range is not confined to the larger genera, for several monotypic genera (*Dendrotettix*, *Phoetaliotes*, and *Oedaleonotus*) display a wide difference between different forms of the single species they possess, in the length of the tegmina, a difference which is also paralleled or almost paralleled among certain species of the genera *Hesperotettix*, *Podisma*, *Melanoplus*, and *Paroxya*, and particularly of the genus *Melanoplus*.

This last genus is of particular interest in this connection, for it is subequally divided between distinctly short-winged and distinctly long-winged forms, which only rarely appear to be closely allied; yet in four of the species, *M. dawsoni*, *M. marginatus*, *M. fasciatus*, and *M. extremus*—species in no way closely related—there is a marked dimorphism in respect of the length of the tegmina, the first two being normally possessed of tegmina only slightly longer than the pronotum, the last two of tegmina hardly as long, if as long, as the abdomen, but all occasionally equipped with tegmina distinctly surpassing the hind femora. When, however, we compare these fully developed tegmina (Plate I, figs. *a*, *c*, *f*, *i*) either with the abbreviated tegmina of the same species, as in *M. extremus* (Plate I, fig. *g*), or with those of their nearest macropterous allies, *M. gladstoni* (Plate I, fig. *b*), *M. paroxyoides* (Plate I, fig. *k*), and *M. borealis* (Plate I, fig. *d*), as in the other species, we can not fail to be struck by the common differences which separate these abnormal macropterous tegmina from the normal tegmina of the genus. (See further the tegmina of the type of the genus, *M. femur-rubrum*, Plate I, fig. *h*.) Instead of the regularly tapering form normal to the genus, the added portion, which is largely the extension of the region beyond the post-radial intercalary area, is nearly equal, giving the tegmina a considerably greater apical breadth and a consequent openness of neuration, besides a less tapering form. What is further to be noticed is that this apical breadth and openness of neuration is also the characteristic of several cases in other genera where there is similar dimorphism in length of tegmina, as in *Dendrotettix quercus*, *Podisma alpina*, and *Phoetaliotes nebrascensis* (Plate I, fig. *e*). In *Podisma* the most abbreviated form of wing is plainly normal, and I am therefore inclined from these examples to regard the abbreviated as the normal form in *Dendrotettix*, *Phoetaliotes*, and the species of *Melanoplus* (except, of course, *M. femur-rubrum*) here illustrated. The same, however, is not the case in *Oedaleonotus*, where dimorphism of similar degree is found, and it is therefore prob-

able that the fully equipped form is here the normal, although, so far as we now know, it is much less commonly found than the brachypterous forms. Other instances where there is considerable but not so marked nor perhaps so uniform a difference in wing-length is in *Paroxya floridana* and perhaps *Hesperotettix viridis*, in both which genera the length of the tegmina is variable. In these two species the tegmina are not apically broad in the macropterous forms, and differ only in length from the brachypterous forms.

Materials, etc.—The specimens forming the basis of the present study are in my own cabinet, which contains, often in large series, the greater portion of the species, collected in large part by myself in different sections of the country, but supplemented by specimens secured from the Texan collections of Boll and Belfrage, a large series from Iowa and Illinois obtained by Doctor J. A. Allen, and others from the South-western States and Mexico by Edward Palmer; besides the entire collection of Mr. P. R. Uhler, who many years ago generously turned over to me his own private collection, containing among other things many specimens obtained from the early explorers of the West.

Through the favor of the Assistant Secretary of the Smithsonian Institution, in charge of the United States National Museum, Doctor G. Brown Goode, and the Honorary Curator of Insects in the same institution, Doctor C. V. Riley, I have had the Museum's entire collection of Melanopli in my hands during this study. The collections of the Museum of Comparative Zoology in Cambridge, Massachusetts, have also been open to me. My neighbors and colleagues, Mr. Samuel Henshaw and Mr. A. P. Morse, have also placed all their Melanopli in my hands; and from Professor Lawrence Bruner, of Lincoln, Nebraska, I have received a complete series of all the forms known to him, which has been on the whole the most important aid I have received. Professor Jerome McNeill, who had begun a study of the Melanopli, mainly of the National Museum, not only generously transferred the work to my hands, but gave me free use of his notes and sent me several species otherwise unknown to me. The University of Kansas sent me a series of interesting western forms in its museum, Mr. W. S. Blatchley a series of the Indiana species known to him, Professor C. P. Gillette interesting forms from Colorado, and Professor H. E. Weed a few from Mississippi. All of these gentlemen have freely answered many inquiries made of them, and any failing in the present paper must be laid at my door. In this way I have seen the types of nearly all the species described from North America, and while in England Mr. Samuel Henshaw kindly examined for me several of Walker's types at the British Museum. I have been further aided for the European species by Hofrath Brunner von Wattenwyl, Doctor Chr. Aurivillius, and Mons. A. de Bormans.

In all, I have examined for the purposes of this paper nearly eight thousand specimens, of which about seven thousand belong to the

single genus *Melanoplus*. The sexes are nearly equally divided, the males forming about forty-six per cent of the whole. Thirty genera (eighteen new) and two hundred and seven species (one hundred and fifteen new) are described in the present paper.

Finally, by the aid of a grant from the ELIZABETH THOMPSON SCIENCE FUND I have been able to procure illustrations of the abdominal appendages of every available species.

A few words should be added regarding certain details of presentation: Instead of giving the range of variation in the measurements of each species, I have selected as far as possible typical average specimens, male and female, for the purpose, taking the measurements of all parts from the same individuals. The number of individuals of each species seen is given, and the localities from which they came immediately added, with the name of the collector (when not myself), and when not from my own collection, the source from which I have received them stated (in parentheses); occasionally my own name is there added, when specimens from the same source are also found in my collection; where no parenthesis follows the locality, the specimens referred to are in my collection.

In describing the abdominal appendages of the males, I have found it convenient to introduce a few new terms. These are: *Furcula* for the pair of backward-directed apophyses of the last dorsal segment, which overlie, generally in a more or less forked position, the base of the supraanal plate; *infracercal plates* for the variously developed but generally inconspicuous paired plates, which underlie in part the cerci, in part the lateral portions of the supraanal plate; and *pallium* for the sometimes erectile, membranous pellicle partially closing the open cavity formed of the walls of the subgenital plate, and variously developed in the different genera.

December 20, 1895.

NOTE.—The exclamation point employed in the synonymy of the species has its usual significance—that the reference is authoritative from an examination of the original types of the author in the passage referred to, with the present paper in view.

ANALYTICAL KEY TO THE GENERA OF NORTH AMERICAN MELANOPLI
(INCLUDING THE OLD WORLD FORMS).¹

A¹. Lateral margins of subgenital plate (last ventral segment) of male, as seen laterally, straight throughout, or very slightly convex, never at all abruptly amplified at the base.

b¹. Body exceptionally slender; mesosternal lobes subattangent in both sexes; prozona three times as long as metazona..... 1. *Gymnoscirtetes* (p. 14).

b². Body not exceptionally slender; mesosternal lobes in both sexes so widely separated that the interspace between them is at most twice as long as broad; prozona not more than twice as long as metazona.

c¹. Interspace between mesosternal lobes of female decidedly transverse, sometimes twice as broad as long; of male sometimes transverse, sometimes quadrate or subquadrate; tegmina lobiform, linear, or wanting.

d¹. Interspace between mesothoracic lobes of male decidedly transverse, as broad as or broader than the lobes; the pronotum without lateral carinae; tegmina ovate or wanting..... 2. *Netrosoma* (p. 16).

d². Interspace between mesothoracic lobes of male quadrate or subquadrate, or, if feebly transverse (as in *Paradichroplus*), not so broad as the lobes, and then the pronotum furnished with lateral carinae; tegmina ovate or linear.

e¹. Subgenital plate of male pyramidal, pointed, a slight tubercle extending beyond its posterior margin, but the margin extending well beyond the apex of the supraanal plate..... 3. *Paradichroplus* (p. 18).

e². Subgenital plate of male more or less conically protuberant apically, but its interior apical margin not surpassing or barely surpassing the apex of the supraanal plate.

f¹. Apical tubercle of subgenital plate small, extending but a short distance beyond the supraanal plate; cerci of male abruptly narrowed before the middle by excision of the inferior margin, the apical half narrow; lateral carinae of pronotum wholly wanting..... 4. *Phaetrotettix* (p. 22).

f². Nearly the whole subgenital plate forming a blunt conical tubercle projecting some distance beyond the supraanal plate; cerci of male forming broad, apically decurved, subfalcate laminae; lateral carinae of pronotum more or less distinct..... 5. *Conalcaea* (p. 23.)

e³. Interspace between mesosternal lobes of female generally longer than broad, sometimes quadrate, rarely feebly transverse²; of male never at all transverse (except feebly in *Sinaloa* and *Cephalotettix*); tegmina variable.

d³. Tegmina never fully developed, rarely as long as the pronotum, lateral and ovate, or linear, or wholly wanting; hind margin of pronotum distinctly truncate; fore and middle femora of male (except in *Phaulotettix*) distinctly more gibbous than in the female.

e⁴. Fureula of male wanting or forming a pair of brief lobes at most no longer than broad.

¹ By permission of the Assistant Secretary this key has been issued in advance in the Proceedings of the American Academy, XXXII, No. 9.

² *Cephalotettix*, in which the female is unknown, is placed in this division.

- f*¹. Last dorsal segment of male furnished mesially with a pair of slightly protuberant rounded lobes; cerci of male compressed laminate, beyond the slightly narrowing basal portion equal or subequal, the tip curved downward or inferiorly angulate at apex.
- g*¹. Prosternal spine erect; interspace between mesothoracic lobes of male nearly twice as long as broad; fore and middle femora of male noticeably gibbous; subgenital plate of male terminating in a large conical tubercle..... 6. *Barylettix* (p. 27).
- g*². Prosternal spine retrorse; interspace between mesothoracic lobes of male only a little longer than broad; fore and middle femora of male only slightly gibbous; subgenital plate of male with no apical tubercle.
7. *Phaulotettix* (p. 29).
- f*². Last dorsal segment of male entirely without projecting lobes or furcula in any form, unless as exceptionally broad and short sessile plates; cerci of male (except in *Cephalotettix*) apically acuminate or curved upward.
- g*¹. Head large and eyes, at least in male, large and very prominent, the breadth of the head distinctly exceeding the greatest width of the pronotum; interspace between mesothoracic lobes of male slightly transverse 8. *Cephalotettix* (p. 30).
- g*². Head normal and eyes not very prominent even in the male, so that the breadth of the head does not exceed the greatest width of the pronotum; interspace between mesothoracic lobes of male distinctly longer than broad.
- h*¹. Tegmina lobiform; subgenital plate of male protruding beyond the tip of the supraanal plate by less than half the length of the latter; cerci of male compressed, subequal, the tip broad.
9. *Rhabdotettix* (p. 32).
- h*². Tegmina linear; subgenital plate of male protruding beyond the tip of the supraanal plate by much more than half the length of the latter; cerci of male tapering from the base, the tip acuminate.
10. *Cyclocercus* (p. 36).
- e*². Furcula of male consisting of a pair of parallel, attingent, cylindrical prominences, generally at least twice as long as broad.
- f*¹. Tegmina lobiform; interspace between mesosternal lobes of male slightly transverse; cerci of male forming compressed, subequal laminae.
11. *Sinaloa* (p. 40).
- f*². Tegmina wanting; interspace between mesosternal lobes of male longer than broad; cerci of male styliform, conical 12. *Paraidemona* (p. 41).
- d*². Tegmina fully developed or abbreviate, never much if any shorter than the pronotum; hind margin of pronotum distinctly angulate; fore and middle femora scarcely more gibbous in the male than in the female (except in some species of *Campylacantha*).
- e*¹. Tegmina fully developed; disk of pronotum nearly flat, the lateral lobes nearly at right angles to it, the posterior margin rectangulate or subrectangulate; prosternal spine quadrate, appressed, broadly truncate.
13. *Aidemona* (p. 44).
- e*². Tegmina abbreviate; disk of pronotum tectiform, the posterior margin obtusangulate; prosternal spine more or less conical and acuminate.
- f*¹. Head not prominent, the summit very slightly arched longitudinally; prosternal spine erect; furcula of male composed of projecting cylindrical fingers; surface of the body very feebly pilose.... 14. *Hypochlora* (p. 46).
- f*². Head prominent, the summit strongly arched longitudinally; prosternal spine more or less retrorse; furcula of male reduced to slight, scarcely projecting lobes; surface of body rather densely pilose.
15. *Campylacantha* (p. 48).

A². Lateral margins of subgenital plate of male suddenly amplify to a considerable degree at the base; or if not to a considerable degree, then the entire margin rather strongly convex or sinuate.

b¹. Subgenital plate of male furnished with a distinct subapical tubercle (i. e., one in which the apical margin does not pass through and form a part of the summit of the tubercle, but where it is distinctly separated from that summit), but not otherwise tumescent.¹

c¹. Median carina of pronotum well developed and equally developed throughout, accompanied on the front of the prozona by distinct lateral carinae; prosternal spine sharply acuminate; tubercle of subgenital plate directed wholly backward, occupying the middle of the terminal portion of the plate; furcula distinctly developed. 16. *Eotettix* (p. 53).

c². Median carina of pronotum feebly developed and generally much more feebly on the prozona than on the metazona, accompanied by no lateral carinae whatever; prosternal spine bluntly acuminate; tubercle of subgenital plate directed upward or upward and backward, occupying the upper extremity of the terminal portion of the plate.

d¹. Body relatively slender and compressed, not much enlarged at the metathorax, particularly in the male; disk of the pronotum tectiform,² the prozona not distinguished from the metazona either by its plane or by any lack of a median carina, which latter is generally marked in color; pronotum fully half as long again as broad; hind femora long and slender; apical tubercle of male abdomen prominent; furcula present as distinctly projecting lobes; terminal segments of female abdomen not abbreviated, the ovipositor fully exerted.

17. *Hesperotettix* (p. 55).

d². Body relatively short and stout, considerably enlarged at the metathorax even in the male; disk of pronotum gently convex transversely, the prozona slightly and independently tumid with no median carina, thus distinguishing it from the metazona;³ hind femora relatively short and stout; apical tubercle of male abdomen not very prominent; furcula scarcely or not apparent; terminal segments of female abdomen abbreviated, the ovipositor only partially exerted. 18. *Aeoloplus* (p. 68).

b². Subgenital plate of male with no distinct subapical tubercle, but often apically prolonged or tumescent.⁴

c¹. Meso- and metastethia together, in both sexes, no longer or scarcely longer than broad; metastethium narrowing but little posteriorly, so that the portion behind the metasternal lobes is but little narrower than the rest, rarely (in the male) less than three-fourths its width; cerci of male very simple, subconical; straight; ovipositor half concealed. 19. *Bralynotes* (p. 80).

c². Meso- and metastethia together, at least in the male and nearly always in both sexes, distinctly longer than the width of the metastethium; the latter rapidly narrowing posteriorly, so that the portion behind the metasternal lobes is not, or is hardly more than, one-half the greatest width of the metastethium; cerci of male variable; ovipositor generally fully exerted.

d¹. Interspace between mesosternal lobes of male distinctly transverse,⁵ as

¹ See note under alternate category.

² This feature is not so apparent in the first three species of *Hesperotettix* as in the others.

³ This feature is less marked in *Ae. tenuipennis* and *Ae. elegans* than in the others.

⁴ There is a minute subapical tubercle in some species of the flabellifer series of *Melanoplus*, but in these the male cerci are exceptionally broad and flabellate, while in the species of the alternate category (*A² b¹*) the cerci are very slender and tapering.

⁵ In many cases the interspace is truncato-cuneiform or broadly clepsydral, in which cases the breadth is to be measured in the middle. In a single species of *Podisma*, *P. dairisama*, the interspace is slightly longitudinal.

broad as, or nearly as broad as, the lobes themselves; of the female distinctly or strongly transverse, fully as broad as or (and generally) broader than the lobes; metasternal lobes of male generally distinctly distant, occasionally approximate; of the female generally more distant, the interspace in the latter generally as wide as or wider than the frontal costa; tegmina typically abbreviate.

*e*¹. Face almost vertical; eyes small, but prominent and widely distant; pronotum constricted in the middle, with deeply impressed transverse sulci, and the lateral lobes not obliquely truncate apically in front; distinct lateral carinae 20. *Dendrotettix* (p. 91).

*e*². Face a little oblique; eyes rather large, not very prominent, and not greatly distant; pronotum not, or but feebly, constricted in the middle, with generally feebly impressed transverse sulci and the lateral lobes obliquely truncate apically on the anterior section..... 21. *Podisma* (p. 94).

[*f*¹. Pronotum of subequal width, the sides nearly parallel; subgenital plate of male normal..... *Podisma*, s.s.

*f*². Pronotum enlarging posteriorly, conspicuously in the female; subgenital plate of male exceptionally expanded, laterally tumid and elevated premarginally *Eupodisma*.]

*d*². Interspace between mesosternal lobes generally longer or much longer than broad in the male, almost never (see *Melanoplus montanus* and *M. borealis*) in the least broader than long even when the sides of the interspace are posteriorly divergent; generally quadrate in the female but more variable than in the other sex, sometimes as narrow as there, more often subtransverse, occasionally in some short-winged forms (as in *Melanoplus artemisiae*, *M. militaris*, *M. altitudinum* and *Asemoplus montanus*) distinctly transverse; in both sexes always distinctly, generally much, narrower than the lobes (except in the females of the cases just cited, where they are barely narrower); metasternal lobes of male generally attingent or subattingent, rarely only approximate; of the female less distant than in the alternate category (*A*²*b*²*c*¹*d*¹), generally approximate or subapproximate, the interspace generally narrower than the frontal costa; typically the tegmina are completely developed.

*e*¹. Face almost vertical or a little oblique, its angle with the fastigium rarely less than 75°; eyes rounded oval, never more, generally less, than half as long again as broad; portion of metasternum lying behind the lobes transverse, more than twice as broad as long; tegmina normally present.

*f*¹. Tegmina always present; sides of first abdominal segment with a distinct tympanum.

*g*¹. Fastigium of vertex plane or convex; eyes separated widely, the space between them twice as broad as the frontal costa; pronotum furnished with distinct percurrent lateral carinae; tegmina abbreviate; cerci apically acuminate..... 22. *Paratylotropidia* (p. 117).

*g*². Fastigium of vertex more or less depressed or with elevated lateral margins; eyes separated narrowly, at most but little further apart than the width of the frontal costa; pronotum with indistinct¹ or no lateral carinae; tegmina fully developed or abbreviate; cerci variable, rarely acuminate apically.

*h*¹. Inferior genicular lobe of hind femora with at least a darker basal spot or transverse band; cerci of male variable, often enlarging apically.

*i*¹. Dorsum of pronotum rarely or never twice as long as the average breadth, generally only half as long again even in the male, generally constricted more or less in the middle; antennae even when longest (as in *Melanoplus nitidus* and *M. packardii*, for instance) no

¹ In a few species they are tolerably distinct.

longer than the hind femora and only twice as long as the pronotum alone; face rarely as declivent as in *Paroxya*; prozona usually a half longer than the metazona.

*j*¹. Head not large in proportion to pronotum, nor prominent, but little longer than the prozona, unless (as in *Melanoplus spretus*) the latter is distinctly transverse; pronotum in no way subsellate, nor flaring in front; tegmina, when fully developed, narrow, rarely (*Melanoplus dawsoni*,¹ *M. extremus*, *M. marginatus*, etc.) rather broad, but then very distinctly tapering, more or less tapering in distal half, at a distance from the apex equal to the breadth of the tegmina distinctly narrower than the metazona, the intercalaries and cross-veins of the discoidal area (except in *M. dawsoni completus* and *M. marginatus amplus*) relatively numerous, at least in the apical fourth and usually throughout, the venation in general sharp and clearly defined, the area intercalata generally distinctly defined by the adjustment of the veins at its distal extremity, the humeral vein straight and apically arcuate, nearly always terminating either on the apical margin or but a short distance before it, running for some distance almost exactly parallel to the costal margin or merging insensibly into it; cerci of male very variable, very rarely (*Melanoplus flabellatus*, *M. puer*) substyliform, and then the subgenital plate is either exceptionally broad, or only moderately narrow and the apical margin elevated..... 23. *Melanoplus* (p. 120).

*j*². Head large in proportion to pronotum, especially above, and prominent, nearly half as long again as the long prozona; pronotum faintly subsellate, feebly flaring in front to receive the head; tegmina, when fully developed, broad and subequal, hardly tapering in the distal half, at a distance from the apex equal to the breadth of the tegmina as broad as the metazona, the intercalaries and cross-veins of the discoidal area everywhere few, the venation in general loose and ill defined, the area intercalata not distinctly marked by the adjustment of veins at its distal extremity, the humeral vein (the upper of the pair of stout veins from the upper attachment) broadly sinuous, terminating on the costal margin at least as far before the apex as the breadth of the tegmina, nowhere running closely parallel to that margin nor merging into it; cerci of male styliform, the subgenital plate very narrow, the margin not apically elevated..... 24. *Phoetaliotes* (p. 376)

*i*². Dorsum of pronotum twice as long as average breadth, at least in the male, with no median constriction; antennae, at least in the male, generally longer than the hind femora and much more than twice as long as the pronotum, generally twice as long as head and pronotum together; face more declivent than in *Melanoplus*; prozona only about a third longer than the metazona.

25. *Paroxya* (p. 380).

*h*². Inferior genicular lobe of hind femora wholly pallid, with no dark basal spot or transverse band; cerci of male conical or subconical or basally bullate, always apically pointed.

*i*¹. Subgenital plate of male terminating in a pronounced tubercle; prosternal spine slender..... 26. *Poecilotettix* (p. 385).

*i*². Subgenital plate of male, even when apically angulate, not furnished with an apical tubercle; prosternal spine stout.

*j*¹. Relatively heavy-bodied; dorsal disk of prozona tumid independently of the metazona; pronotum distinctly angulate or con-

¹In form of tegmina and sparseness of neuration this species is the *Melanoplus* most nearly allied to *Phoetaliotes*, and like it it is dimorphic as to tegmina.

- vex behind; the portion of the metasternum lying behind the lobes laterally extended, reaching to the coxae; tegmina fully developed or abbreviate, but overlapping, with many longitudinal veins; cerci of male very stout and bullate on basal half or more; abdomen of female bluntly rounded apically, the posterior segments much abbreviated; ovipositor but slightly exerted. . . 27. *Oedaleonotus* (p. 390).
- j*². Relatively slender-bodied; dorsal disk of prozona not tumid independently of the metazona; pronotum truncate posteriorly, portion of metasternum lying behind the lobes laterally abbreviated, much narrower than the width between coxae; tegmina linear, lateral, distant, with only a few longitudinal veins; abdomen of female tapering regularly to a pointed tip; ovipositor normally exerted. 28. *Asemoplus* (p. 394).
- f*². Tegmina wanting; sides of first abdominal segment with no tympanum. 29. *Philocleon* (p. 396).
- e*². Face rather strongly oblique, the angle it makes with the fastigium varying about from 55° to 67°; eyes elongate, almost or quite twice as long as broad; portion of metasternum lying behind the lobes subtriangular, not greatly broader than long; tegmina linear and lateral or absent. 30. *Aptenopedes* (p. 398).

1. GYMNOSCIRTETES, new genus.

(γυμνός, naked (in allusion to its apterous condition); σκιρτάω, to leap.)

Gymnoscirtetes BRUNER, MS.

Body exceptionally long and slender, subcylindrical, a little compressed. Head excepting eyes scarcely enlarged, the face considerably declivent; vertex scarcely (male) or somewhat (female) tumid, triangular, the eyes approximate, especially in the male where the slender fastigium between them is narrowly sulcate; fastigium declivent, expanding greatly in front and broadly hollowed; frontal costa of moderate width but distinctly broader than the interspace between the eyes, subequal but constricted just below the ocellus, percurrent, sulcate; eyes large, prominent, particularly in the male where they are subrotund, while in the female they are nearly half as long again as broad, in both sexes but particularly in the male about twice as long as the anterior infraocular portion of the genae; antennae rather slender, cylindrical, much longer than the head and pronotum together. Pronotum compressed cylindrical, truncate at each extremity, with completely parallel sides and with a slight uniform median carina, the prozona quadrate above and fully three times as long as the metazona, its two median sulci slightly impressed, subapproximate, and distant from either margin; lateral carinae wholly absent, the lateral lobes very short, their lower margin obtusely angulate, the posterior angle distinct but obtuse. Prosternal spine rather slight and moderately slender, conical, erect; mesosternal lobes subattinent in both sexes or even attinent in the male; metasternal lobes attinent in both sexes. Apterous. Fore and middle femora scarcely more gibbous in the male than in the female; hind femora very slender, unarmed; hind tibiae with short spines, similar in length on either side, 8-9 in number in the

outer series. Lateral margin of the subgenital plate of the male straight from base outward, at the tip slightly elevated into a minute erect tubercle; cerci simple, conical.

This genus is very distinct from anything known to me, and I have been in some doubt as to whether it should be placed in *Melanopli*, especially as in the only male I have seen there were but eight spines on the outer side of the hind tibiae; but Professor L. Bruner informs me that he has an immature male with nine spines, which agrees with what I find in the female, so that this feature must be looked on as variable, as it is in some other genera of *Melanopli*.

Although I have placed it at an extreme distance from *Aptenopedes*, from which it is clearly widely separated in the lack of any basal ampliation of the subgenital plate of the male, it recalls that genus in its general appearance and especially in the triangular vertex of the head; it differs, however, much from it in its subcylindrical slender body and the close approximation of the sternal lobes.

It is represented by a single species occurring in Florida.

GYMNOSCIRTETES PUSILLUS, new species.

(Plate II, fig. 1.)

Gymnoscirtetes pusillus BRUNER!, MS.

Head above and in front between the lateral carinae of the face lighter or darker chestnut brown; lower part of the genae of a similar color but in a lighter tint, while the upper part of the genae is lemon yellow in continuation of the body stripe of that color; vertex with a mediodorsal, greatly widening, blackish fuscous stripe including a yellowish thread; basal joint of antennae yellow, the remainder dark testaceous. Pronotum luteo-testaceous, above the median carina fuscous; upper half of lateral lobes piceous, forming a broad longitudinal band which extends forward to the eyes (where it is margined above with dull yellow) and behind over the abdomen, becoming there somewhat narrowed posteriorly and broken beneath, fading out on the terminal segments; lower half of lateral lobes of pronotum lemon yellow, forming a band which extends forward over the head and backward over the meso- and metathorax, and on the abdomen (growing duller) becomes a part of the general color of the under surface. Metazona and extreme anterior part of prozona feebly and rather sparsely punctulate; upper surface of meso- and metanota and of abdomen like the pronotum, but more or less infuscated. Hind femora yellow luteous, the upper half or less of the outer face more or less plumbeous; hind tibiae pale dull green, the spines black, pallid at base. Supranal plate of male large, triangular, the apex acuminate, a little blunt, the whole central basal portion elevated to form another similar triangle in which lies a pronounced demi-lanceolate, basal sulcus, with sharp walls, considerably less than half as long as the plate; furcula consist-

ing of a pair of scarcely projecting rather distant rounded lobes; cerci styliform, slender, gently tapering to a rather blunt point, conical, straight or feebly incurved apically, fully as long as the plate; infra-cercal plate slightly developed, concealed when the cerci are appressed.

Length of body, male, 13 mm., female, 19.75 mm.; antennae, male, 5.75 mm., female, 6.5+ mm.; hind femora, male, 7 mm., female, 9.5 mm.

One male, one female. Jacksonville, Duval County, Florida, Ashmead (L. Bruner; U.S.N.M. [No. 701]).

2. NETROSOMA, new genus.

(*νητρον*, a spindle; *σωμα*, body.)

Body subfusiform, especially in the female, compressed cylindrical, glabrous but very sparsely pilose. Head not prominent, the genae tumescent, the vertex considerably arched, slightly elevated above the level of the pronotum, the fastigium very narrow in the male, rather narrow in the female, gently descending, deeply sulcate, the face retreating somewhat, particularly in the male; eyes rather prominent, broad oval, half as long again as the infraocular portion of the genae, at least in the male; frontal costa rather prominent and narrowed above, below moderately broad, at least as broad as (female) or distinctly broader than (male) the interspace between the eyes, with the face feebly punctate; antennae with the apical joints depressed, fully half (male) or a little less than half (female) as long as the body. Pronotum enlarging considerably and regularly backward, compressed cylindrical, the dorsum well arched transversely, passing quite insensibly into the vertical lateral lobes, with the feeblest possible signs of a median carina, both front and hind margins truncate, the sparsely but distinctly and finely punctate prozona about twice as long as the similarly but more densely punctate metazona, the transverse sulci obliterated on the dorsum. Prosternal spine erect, conical, in the female appressed; interval between mesosternal lobes transverse, as broad as or broader than the lobes in both sexes, the metasternal lobes subattinent (male) or approximate (female). Tegmina lateral and linear, shorter than the pronotum, or wanting. Fore and middle femora of male not at all tumid; hind femora short but not very stout, the hind tibiae with eight spines in the outer series. Extremity of male abdomen feebly clavate and a little upturned, the subgenital plate with lateral margins straight from the very base, with a slight tubercle at tip which scarcely surpasses the supraanal plate; cerci laminate, of moderate breadth, inferiorly acuminate and turned downward at tip; furcula wanting.

Two species are known, both from Mexico.

N. fusiformis may be regarded as the type.

ANALYTICAL KEY TO THE SPECIES OF NETROSOMA.

Tegmina present in both sexes; interspace between the mesosternal lobes of male no broader than the lobes themselves; hind tibiae red on proximal half only.

1. *fusiformis* (p. 17).

Tegmina absent, at least in the male; interspace between the mesosternal lobes of male broader than the lobes themselves; hind tibiae red on distal half only.

2. *nigropleura* (p. 18).

I. NETROSOMA FUSIFORMIS, new species.

(Plate II, fig. 2.)

Body fulvo-luteous with piceous or chocolate black markings. Head with the face and posterior part of the genae fulvo-luteous, the region of and about the frontal costa generally infuscated, the front half of the genae below the eyes, a broad band behind the eyes, a slender medio-dorsal line reaching the posterior part of the fastigium, and the lateral walls of the frontal costa above the antennae, black; antennae fuscous, lighter at base. Upper surface of body behind the head with a median stripe, generally of uniform though in different individuals of varying breadth, generally as broad as the interspace between the eyes, of fulvo-luteous, separating a pair of piceous or chocolate black very broad stripes, which in passing backward broaden on the pronotum and narrow and finally disappear on the abdomen, the metathoracic episterna fulvous. The meso- and metanota and some of the basal abdominal segments are sparsely punctate; posterior margin of the pronotum feebly emarginate, including in the emargination $\frac{1}{2}$ whole dorsal breadth; interspace between the mesosternal lobes of male of the same breadth as the lobes themselves. Tegmina blackish, the veins occasionally lighter, a little longer than the prozona, enlarging slightly beyond the base in the male. Fore and middle femora fuscous; hind femora with the outer face luteo-fulvous or pallid luteous, crossed with a variable obliquity by a pair of broad subtransverse bands of ferrugineo-fuscous or black, often confluent along the lower margin and with a basal spot of the same, the bands repeated on the inner side; upper face and geniculation ferruginous; hind tibiae glauco-plumbeous on the distal, coralline on the proximal half, the transition gradual, the spines pallid with black tips. Supraanal plate of male long triangular with gently convex sides, the tip acutangulate, with a rather deep median sulcus interrupted in the middle, bounded at base by high and coarse rounded walls, at tip by slight walls; furcula wholly wanting; cerci moderately broad, equal from the base or with the slightest possible median constriction, lamellate, as long as the supraanal plate, the apical portion suddenly bent slightly inward, turned strongly downward and sharply acuminate.

Length of body, male, 14 mm., female, 21.5 mm.; antennae, male, 7 mm., female, 8 mm.; tegmina, male, 3 mm., female, 3.25 mm.; hind femora, male, 8.5 mm., female, 12.25 mm.

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Three males, 14 females. Montelovez, Chihuahua, Mexico, September 20, E. Palmer. [U.S.N.M. No. 702, female.]

2. *NETROSOMA NIGROPLEURA*, new species.

(Plate II, fig. 3).

Pezotettix nigropleura BRUNER!, MS.

Body luteo-testaceous, heavily marked with black. Head uniform luteo-testaceous, sometimes feebly infuscated, with a broad black band behind the eyes, and the lateral faces of the frontal costa above the antennae marked with black; antennae blackish fuscous. Pronotum and body behind it with a broad equal mesial band of luteo-testaceous, separating two very broad black bands precisely as in *N. fusiformis*, only the lower third of the lateral lobes, the mesothoracic episterna and the lower half of the metathoracic episterna luteous. Meso- and meta-nota with scarcely perceptible very sparse punctuation; posterior margin of the pronotum feebly emarginate, including the whole dorsal breadth; interspace between mesosternal lobes of male a little broader than the lobes themselves. Tegmina wholly wanting in the male (female unknown). Hind femora luteo-testaceous with very feeble cloudy signs of bifasciate markings similar to those of *N. fusiformis*; hind tibiae dull luteous at base passing on apical half into coral red, the spines pallid with black tips. Supraanal plate of male triangular with straight sides, the extremity abruptly truncate and with a small mesial triangular appendix, the basal half with a raised rounded longitudinal ridge, having a tolerably deep mesial furrow on its summit; furcula wholly wanting; cerci moderately broad, lamellate, tapering gently and straight on basal third or more, beyond arcuate subfalcate and gently incurved, terminating in an acute but rounded angle below. Length of body, male, 13 mm.; antennae, 8.5 mm.; hind femora, 8.25 mm.

Two males. Lerdo, Durango, Mexico (L. Bruner).

Besides the differences from *N. fusiformis* mentioned in the table, the present species has relatively longer antennae.

3. *PARADICHRPLUS*.

(παρά, beside; Dichroplus, a genus of Melanopli.)

Pezotettix (Div. II) STÅL, Bih. K. Sv. Vet. Akad.-Handl., V. No. 9 (1878), pp. 4, 8. *Paradichroplus* BRUNER, Rév. Syst. Orth. (1893), p. 145.

Body rather elongate, compressed, sparsely pilose. Head not prominent, nor broader than the thorax, the vertex gently convex, scarcely or not elevated above the level of the pronotum, the fastigium rounded, descending moderately, the face retreating considerably, especially below; interspace between the eyes not very narrow even in the male, as broad as the broadest part of the frontal costa, which is at the ocellus, the costa narrowing considerably above, slightly sulcate below and failing to reach the clypeus; antennae short and stout, scarcely if at

all exceeding in length the pronotum. Pronotum enlarging regularly and slightly (male) or considerably (female) from in front backward, the disk nearly plane, separated by pereurrent lateral carinae (as distinct as the pereurrent median carina) from the subvertical lateral lobes, the front and hind border truncate or subtruncate, the nearly smooth prozona less than twice as long as the rather feebly punctate metazona, rather longer than broad, divided in the middle by a feeble transverse sulcus, followed at less than half the distance to the metazona by a doubly arcuate sulcus at least as distinct. Prosternal spine erect, variable; mesosternal lobes separated by an interval which is subquadrate but a little transverse and nearly as broad as the lobes in the male, strongly transverse and broader than the lobes in the female, the metasternal lobes subapproximate in both sexes. Tegmina elliptical, not wholly lateral, shorter than the pronotum. Fore and middle femora tumid in the male, the hind femora moderate, compressed, the hind tibiae with 9-11 spines in the outer series. Extremity of the male abdomen upturned and slightly enlarged, the subgenital plate strongly produced and elongate, its lateral margins feebly convex, meeting apically at an acute angle which is provided with a slight tubercle and is removed at a long distance from the tip of the supraanal plate; furcula developed slightly or moderately; cerci very long and very slender, laminate, directed inward apically.

Two species are known, coming from Mexico, Central America, and northern South America.

ANALYTICAL KEY TO THE SPECIES OF PARADICHIROPLUS.

Prosternal spine quadrate, appressed, truncate; posterior margin of pronotum feebly emarginate; inner edges of tegmina separated by half the width of the pronotum; furcula well developed. 1. *mexicanus* (p. 19).
 Prosternal spine conical; posterior margin of pronotum entire; inner edges of tegmina subattinent; furcula very slight 2. *varicolor* (p. 21).

I. PARADICHIROPLUS MEXICANUS.

(Plate II, figs. 4, 5.)

Platyphyma mexicanum BRUNNER, Verhandl. Zool.-Bot. Gesellsch. Wien, 1861 (1861), p. 224; Orth. Stn. (1864), p. 4.—WALKER, Cat. Derm. Salt. Brit. Mus., Suppl., V (1871), p. 71.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 224.

Caloptenus mexicanus WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), pp. 682-683.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 227.

Paradichroplus mexicanus BRUNNER, Rév. Syst. Orth. (1893), p. 145.

Blackish fuscous above with a strong ferruginous tinge, dull flavous below. Head with tumescent genae plumbeous or livid, more or less heavily mottled with ferrugineo-fuscous, the summit wholly blackish fuscous, separated from a broad blackish fuscous band behind the eyes by a lighter but obscure stripe behind the upper part of the eyes; frontal costa rather prominent above, especially in the male, punctate,

narrowed a little above the ocellus and slightly sulcate below it, the fastigium shallowly sulcate; antennae ferruginous. Pronotum with the hind margin feebly emarginate, the disk nearly uniform in color, but with the lateral lobes sometimes lighter and the metazona sometimes longitudinally combed with obscure luteous, the lateral lobes mostly of the color of the disk or darker, but their lower portion, both on prozona and metazona, with quadrate patches of dull luteous or flavous, forming a broken band slightly separate from the lower margin. Prosternal spine quadrate, brief, appressed, broadly truncate. Tegmina ovate, less than twice as broad as long, their inner edges separated by half the width of the pronotum, of the color of the upper surface. Fore and middle legs dull ferruginous; hind femora ferruginous, the carinae, lower margin of the outer face, and lower face flavous, on the last often strongly tinged with red; hind tibiae pale red, the spines, except at base, black. Supraanal plate of male triangular, acutely angled at tip, the lateral margins a little elevated, within them the surface tectate, bearing at the summit of the ridge a deep slender sulcus fully two-thirds the length of the plate, the ridge fading beyond. Furcula consisting of a pair of basally approximate, short, triangular, pointed teeth, diverging at nearly right angles; cerci long and very slender, tapering in the basal third, beyond lamellate, equal nearly to the tip, incurved gently and downcurved as gently, feebly twisted, the apex acutangulate below by the slope of the upper margin, somewhat longer than the supraanal plate, pilose; infracercal plates moderately broad, laterally arcuate, about as long as the supraanal plate.

Length of body, male, 18 mm., female, 23.5 mm.; antennae, male, 5.5 mm., female, 6 mm.; tegmina, male, 3.25 mm., female, 4 mm.; hind femora, male, 10.5 mm., female, 12.75 mm.

Three males, 2 females. Mount Orizaba, Mexico, W. S. Blatchley; the same, 11,500 feet, March (L. Bruner). Originally described from the same mountain as collected by M. Ang. Sallé "au pied de la neige." Mr. Blatchley informs me that at the time of his visit the snow line was at 15,000 feet, and adds that he took a single specimen of the species at 13,500 feet, "a very few individuals may have been taken as low as 9,000 feet, but the species was common only between 10,000 feet and 12,000 feet; above 12,000 feet scarce."

According to statements in the daily press,¹ Orizaba, which is of volcanic origin, showed signs of a renewal of activity early in March, 1895, when hot ashes were ejected, the snow disappeared from the summit and the vegetation of the upper part of the mountain was burned. Possibly this means the extinction of *Paradichroplus mexicanus*.

The following description of the living insect, made upon the spot, has been kindly sent me by Mr. Blatchley: Pronotum of male ash gray tinged with yellow, especially along the median line; sides of pronotum with a brownish stripe on upper half, bordered below with

¹ See especially the Examiner of San Francisco, March 12, 1895.

one of yellowish white; face grayish; abdomen with a yellow line along the back, the sides brown, the sternites yellow; sternites of thorax bluish gray; a whitish bar extends from base of tegmina diagonally to hind coxae; sides of hind femora brown with two yellowish stripes on upper margin, below light orange; tibiae deep orange; tarsi flesh color. Female tinged with greenish yellow where there is clear yellow in the male; cheeks, whole sternum and lower sides of abdomen blue, especially the sternites of thorax; lower sides of hind femora and tibiae deep orange.

Mr. Samuel Henshaw, while recently in London, procured for me at the British Museum a drawing of the genitalia of Walker's *Caloptenus mexicanus*, described by him as new, showing that it was unquestionably the present species. (See Plate II, fig. 4.)

2. PARADICHIROPLUS VARICOLOR.

(Plate II, fig. 6.)

Pezoteitix varicolor STÅL, Bih. K. Sv. Vet.-Akad. Handl., V (1878), No. 9, pp. 9-10.
Paradichroplus varicolor BRUNNER, Rév. Syst. Orth. (1893), p. 145.—GIGLIO-TOS,
 Zool. Jahrb., Abth. Syst., VIII (1895), p. 813.

Dark ferrugineo-testaceous, lutescent beneath, with a black lateral stripe. Head with the genae not in the least tumescent as seen from above, the summit blackish fuscous, and behind the eyes a broad piceous band; raised portions more or less obscured with blackish fuscous; frontal costa much narrowed above, punctate, plane; fastigium feebly sulcate anteriorly. Pronotum with the hind margin entire, the lateral carinae feeble on the metazona, the upper portion of the lateral lobes with a broad piceous band, the continuation of that behind the eye, somewhat tinged with chocolate, accompanied on the prozona by a slender black stripe between the front and middle sulcus, halfway between the black band and the lower margin. Prosternal spine conical. Tegmina half as long again as broad, apically acuminate, their inner edges subattingent, testaceous, the costal half, in continuation of the pronotal stripe, infuscated. Fore and middle legs ferruginous above, luteous below; hind femora with the upper half of the outer and upper third of the inner face blackish, the upper face ferruginous, the remainder flavous, the hind tibiae dull pale red, the spines black on apical, pallid on basal half. Supraanal plate of male broadly triangular, apically rectangulate, the angle rounded, the surface nearly flat, with a percurrent rather sharply defined median sulcus; furcula consisting of a pair of subattingent, very feeble, rounded lobes; cerci very slender, tapering very gradually on basal half, then laminate and subequal, bent abruptly inward and backward and feebly twisted, terminating in a blunt point.

Length of body, male, 11.75 mm.; tegmina 2.75 mm.; hind femora 8 mm.

One male, Columbia. Originally described from Colombia and Mex-

ico. Having only a male from Columbia, received from Hofrath Bruner von Wattenwyl, I am compelled to base my description and figure upon that alone. Giglio-Tos reports it from Paraguay.

4. PHAEDROTETTIX, new genus.

(φαιδρότος, bright; τέτριξ, grasshopper.)

Body small, compact, distinctly largest at the metathorax, sparsely pilose. Head a little prominent and, with the eyes, nearly as broad as the posterior portion of the pronotum, at least in the male, the vertex moderately convex, slightly elevated above the pronotum, the fastigium descending rapidly and the face retreating somewhat; eyes moderately large, moderately prominent, more prominent in the male than in the female, broad oval, half (female) or less than half (male) as long again as broad, scarcely longer than the infraocular portion of the genae; interspace between the eyes almost equally narrow in both sexes, considerably narrower than the frontal costa, which is not very narrow, subequal, percurrent, sulcate; antennae slender, of similar length in the two sexes, but very little longer than head and pronotum together. Pronotum very feebly flaring in front to receive the head, the metazona flaring considerably throughout, otherwise parallel-sided, compressed, the dorsal surface transversely convex, passing insensibly into the vertical lateral lobes with no lateral carinae, both front and hind margins truncate, the latter feebly and roundly emarginate, a percurrent median carina; prozona sparsely punctate, less than twice as long as the closely punctate metazona, at least in the male, its middle transverse sulcus angulate, being bent forward laterally, its posterior sulcus similarly bent or sinuate, its anterior sulcus rather remote from the front margin. Prosternal spine erect, conical, subappressed; interspace between mesosternal lobes of male subquadrate, slightly longer than broad, of female distinctly transverse, almost as broad as the lobes; metasternal lobes approximate in both sexes. Tegmina linear, lateral, about as long as the prozona. Fore and middle femora tumid in the male; hind femora rather long and slender, the hind tibiae with nine spines in the outer series. Extremity of the male abdomen subclavate, upturned, bluntly rounded, but with a slight apical tubercle formed partly by the compression of the subgenital plate, the lateral margins of which are straight throughout, and at apex do not surpass the tip of the supraanal plate; cerci laminate, subfalcate; furcula subobsolete.

A single species is known, coming from Mexico and southern Texas.

PHAEDROTETTIX ANGUSTIPENNIS, new species.

(Plate II, fig. 7.)

Pezotettix angustipennis BRUNER!, MS.

Fuscous above, luteo-fuscous below. Head livid fuscous, flecked and more or less punctate with fuscous, the vertex (except a livid stripe following the upper edge of the eye and passing backward) and a broad

band behind the middle of the eye blackish fuscous; whole face and lower part of genae punctate; antennae fusco-ferruginous. Pronotum blackish fuscous on prozona, ferrugineo-fuscous on metazona, the upper portion of the lateral lobes with a broad blackish band, on the metazona curving slightly downward and fading out, sometimes edged above anteriorly by a feeble, dull luteous stripe, but beneath sharply defined from the dull luteous remainder of the lateral lobes, this band often subobsolete in the female, or scarcely distinguishable from the disk; metasternal epimera with an oblique luteous stripe. Tegmina dark fuscous. Fore and middle femora luteo-fuscous or fusco-luteous; hind femora with the outer face greenish plumbeous, the upper face ferruginous, the lower luteous, the inner luteous in the lower, fuscous in the upper half, the whole geniculation fuscous; the hind tibiae blue-green, fusco-ferruginous at extreme base and tip, the spines black-tipped. Supraanal plate of male subclypeate, tapering gradually, the broadly subtruncate tip very obtusely angulate, the sides feebly concave, with a median tectate ridge which divides in the basal third to include a narrow, triangular, rather deep sulcus; furecula consisting of a pair of inconspicuous rounded lobes, formed by the slight fullness of the interior angles of the divided halves of the last dorsal segment; cerci broad at base but at once narrowed by the abrupt excision of the lower margin, so as to be less than half the basal breadth, the apical portion subequal, subfalcate, the lower apical angle acute, the whole laminate, scarcely incurved.

Length of body, male, 13 mm., female, 17 mm.; antennae, male, 5.5 mm., fema' 6 mm.; tegmina, male, 2 mm., female, 2.8 mm.; hind femora, male, 8 mm., female, 10 mm.

Six males, six females. Mount Alvarez, San Luis Potosi, Mexico, E. Palmer [U.S.N.M. No. 703, male and female]; Comancho, Durango, Mexico, November (L. Bruner); Corpus Christi Bay, Nueces County, Texas, December 11-20, E. Palmer.

5. CONALCAEA, new genus.

(κῶνος, cone; ἄλκαία, tail.)

Body rather stout, somewhat compressed, slightly (male) or distinctly (female) largest at the metathorax, thinly pilose. Head moderate, slightly prominent in the male only, with the eyes about as broad, in the male, as the metazona; vertex gently convex, scarcely elevated above the level of the pronotum, the fastigium descending rapidly, the face retreating slightly; eyes large, not very prominent, little more so in the male than in the female, longer than (male) or not quite so long as (female) the posterior infraocular portion of the genae, broad oval, hardly more than half as long again as broad in either sex; interspace between the eyes rather narrow, similar in the two sexes, scarcely narrower than the frontal costa, which is subequal, more or less sulcate, and fails to reach the clypeus; antennae slender, rather long. Pro-

notum enlarging slightly (male) or considerably (female) in passing backward, with distinct percurrent median carina and sometimes distinct, sometimes scarcely perceptible lateral carinae, the dorsum very broadly tectate in the first case, obscurely so in the second, the lateral lobes subvertical or vertical; both front and hind margins transverse, the latter emarginate; prozona sparsely punctate, as long as its posterior breadth, about twice as long as the densely punctate metazona, cut in the middle by a distinct, straight, transverse sulcus, and followed at less than half the distance to the metazona by a similarly impressed transverse sulcus of variable direction. Prosternal spine conical, erect, in the male rather long; interspace between mesosternal lobes subquadrate but much narrower than the lobes in the male, distinctly transverse and nearly or quite as broad as the lobes in the female, the metasternal lobes attingent or approximate in the male, moderately distant in the female. Tegmina rather long elliptical, fully as long as the prozona. Fore and middle femora tumid in the male; hind femora not very long and rather stout, but subcompressed, the hind tibiae with nine to ten spines in the outer series. Extremity of the male abdomen subclavate, but elongate by the posterior extension of the subgenital plate, as in *Barytettix*, as a blunt conical tubercle; lateral margins of this plate straight from the base, the apical margin well rounded, reaching beyond the tip of the supraanal plate by a brief distance; cerci and furcula as in *Barytettix*.

The type of this genus is *C. miguelitana*, the only one in which both sexes are known.

Three species are here described; they occur in Mexico and southwestern New Mexico.

ANALYTICAL KEY TO THE SPECIES OF CONALCAEA.

A¹. Lateral carinae of pronotum distinct; posterior margin of pronotum distinctly emarginate.

b¹. Tegmina well rounded at tip; hind tibiae red..... 1. *miguelitana* (p. 24)

b². Tegmina apically truncate; hind tibiae luteous or flavescens.

2. *truncatipennis* (p. 25)

A². Lateral carinae of pronotum obscure, the dorsum passing almost insensibly into the lateral lobes; posterior margin of pronotum only faintly emarginate; lobes of furcula of male much broader than long, scarcely projecting.

3. *neomexicana* (p. 26)

I. CONALCAEA MIGUELITANA, new species.

(Plate II, fig. 8.)

Fusco-testaceous, more or less lutescent beneath, very sparsely pilose. Head dull luteous (male) or olivaceo-testaceous, much infuscated (female); the vertex always more or less infuscated and especially marked with a pair of dark streaks divergent from the base of the fastigium; genae much mottled with fuscous, particularly in the female; fastigium sulcate between the eyes and feebly, in the male only, beyond; frontal costae barely reaching the clypeus, nearly plane but depressed at the ocellus in the female, feebly sulcate except at summit in the male, punctate

especially above, the punctation extending upon the sides of the fastigium; rest of face and lower part of genae sparsely punctate; antennae fuscous, apically ferruginous. Pronotum with the disk of the prozona more uniformly darker than the rest, the lower part of the lateral lobes of the prozona suffused with luteous; thoracic epimera black. Tegmina narrow at the base, enlarging rather rapidly to beyond the middle and then again diminishing to the well-rounded extremity, distinctly shorter than the pronotum but longer than the prozona, black in the interstices of the veins which are fusco-luteous, generally darker below than above. Hind femora variable in color but with the upper half or more of the outer face always dark fuscous, sometimes blackish, the rest of it more or less luteous, the adjoining carinae black, but the others yellowish, the outer portion of the lower surface dull olivaceous, the upper surface olivaceo-fuscous, the genicular arc black; hind tibiae red, feebly incurved, the spines black on their apical half, more or less pallid, especially on the inner side, on their basal half. Abdomen sparsely and coarsely punctate throughout with a pallid median carina, the hinder edges of the segments sometimes deeply infuscated. Supraanal plate of male rather long triangular, with a pair of approximate, rather sharp ridges, subparallel but nearly meeting in the middle, inclosing on basal half a tolerably deep sulcus, just before the extremity of which, outside the middle of either side of the plate, is a very short blunt ridge; furcula consisting of a pair of subattingent minute lobes, projecting by about their own width; cerci compressed, laminate, broad, subequal, tapering a very little at the base, subfalcate, the lower apical portion produced and very acutely angulate, not incurved; apical tubercle coarse and blunt, projecting beyond the apical margin of the subgenital plate but a short distance.

Length of body, male, 19 mm., female, 27 mm.; antennae, male, female, 9 mm.; tegmina, male, 4.1 mm., female, 5 mm.; hind femora, male, 12.5 mm., female, 15 mm.

Two males, 3 females. Sierra de San Miguelito, San Luis Potosi, Mexico, E. Palmer.

2. CONALCAEA TRUNCATIPENNIS, new species.

Fusco-testaceous, mottled with dull ferruginous, the abdomen dull testaceous. Head pale ferrugineo-testaceous, mottled with ferruginous on luteo-testaceous, the summit with two divergent ferruginous spots and feeble signs of a postocular ferruginous stripe; fastigium depressed between the eyes, punctate at tip; frontal costa punctate throughout, very shallowly sulcate; rest of face and lower part of genae sparsely punctate; antennae dark fuscous. Pronotum with feeble signs of a luteous stripe following the lateral carinae, the posterior margin of either side, including that of the lateral lobes, sinuate. Tegmina rapidly enlarging from the constricted base to the middle, beyond subequal, broadly truncate at the extremity, about as long as the prozona, testaceous. Hind femora ferrugineo-testaceous, dull olivaceous beneath,

the genicular are black; hind tibiae luteo-testaceous or flavescens, the spines black-tipped. Abdomen sparsely and coarsely punctate.

Length of body, female, 22 mm.; antennae, 6.75 mm.; tegmina, 3.9 mm.; hind femora, 11.5 mm.

One female. Saltillo, Nuevo Leon, Mexico, March 21-28, E. Palmer.

This species differs from the preceding by its truncate tegmina, paler hind tibiae, more uniform and generally lighter coloring, and the wider interval between the mesosternal lobes of the female, which is here almost or quite as wide as the lobes themselves.

3. CONALCAEA NEOMEXICANA, new species.

(Plate II, fig. 9.)

Ferrugineo-testaceous above, heavily marked with black, testaceous beneath. Head testaceous, with a flavous tinge, flecked with fuscous on the sides, and heavily infuscated above with a narrow streak of luteo-testaceous behind the middle of the upper half of the eye, separating a fuscous patch above from a black patch below; fastigium shallowly and interruptedly sulcate, the frontal costa punctate, sulcate in its middle half, the rest of the face and genae almost equally punctate; antennae?. Pronotum scarcely widening posteriorly, with hardly any indication of lateral carinae, the hind border very feebly emarginate, the disk almost uniformly ferrugineo-testaceous, the upper half of the lateral lobes of the prozona piceous, cut in the anterior half by an oblique luteous streak, the lower half luteo-testaceous; thoracic epimera black. Tegmina enlarging gently from the rather narrow base to the middle of the distal half and then well rounded, fully as long as the prozona, black, with mostly luteous veins. Hind femora with the outer face livid, streaked with black above, the upper face ferruginous, the lower pale green, separated from the outer face by a dark-green carina, the genicular are black; hind tibiae reddish luteous, the spines pallid, with black tips. Abdomen, at least in its basal half, together with the meso- and metanota, black or blackish ferruginous, with a narrow ferrugineo-testaceous median stripe, the black narrowing and finally disappearing posteriorly, coarsely punctate. Supraanal plate of male long triangular, tectate, with a slender and deep percurrent median sulcus, and the lateral margins gradually raised a little; furcula consisting of little more than the thickening of the adjoining edges of the parted halves of the last dorsal segment; cerci very much as in *C. miquelitana*, but more contracted in the middle, wider beyond, with the upper margin in consequence more strongly sinuate; terminal tubercle large and extending beyond the posterior margin of the subgenital plate by a greater distance than the latter is removed from the tip of the supraanal plate.

Length of body, male, 19 mm.; tegmina, 4 mm.; hind femora, 11.25 mm.

One male. Silver City, Grant County, New Mexico (L. Bruner).

6. BARYTETRIX, new genus.

(βαρὺς, heavy; τέττιξ, grasshopper.)

Body heavy, moderately compressed, thinly pilose. Head large, moderately prominent, the vertex gently convex, not raised above the level of the pronotum, the fastigium descending with moderate rapidity and the face retreating slightly; eyes very large, moderately prominent, about equally so in the two sexes, broadly ovate in the male, elliptical in the female, much longer than the infraocular portion of the genae; interspace between the eyes narrow, especially in the male, the fastigium sulcate throughout, widening considerably beyond, the frontal costa relatively broad, considerably broader than the interspace between the eyes; antennae not very slender, long, half as long as the body in the male. Pronotum short, subequal, widening slightly at the metazona, the front margin truncate and laterally plicate, the hind margin truncate and emarginate, its dorsum gently convex, passing insensibly into the vertical lateral lobes, a feeble percurrent median carina; prozona transverse, especially in the female, sparsely punctate, slightly less than twice as long as the densely punctate metazona, crossed in the middle by a distinct transverse sulcus, followed at less than half the distance to the metazona by a similar angulato-arcuate sulcus. Prosternal spine bluntly conical, erect; interspace between mesosternal lobes twice as long as broad in the male, subquadrate and nearly as broad as the lobes in the female, the metasternal lobes rather distant in the male, approximate in the female. Tegmina elliptical, about as long as the prozona. Fore and middle femora very tumid in the male; hind femora short and moderately stout; hind tibiae with nine to ten spines in the outer series. Extremity of the male abdomen subclavate, but with the subgenital plate so produced posteriorly as to form an exceedingly coarse and blunt conical tubercle, the lateral margins straight from the very base, the apical margin removed from the tip of the supraanal plate by considerably more than half the length of the latter; cerci large, laminate, arcuate, the angulate tip directed downward; furcula composed of a pair of minute lobes.

B. crassus may be taken as the type of the genus.

Two species are known, both from Lower California.

ANALYTICAL KEY TO THE SPECIES OF BARYTETRIX.

Tegmina unicolorous; hind margin of pronotum distinctly emarginate; frontal costa sulcate throughout (male) 1. *crassus* (p. 28).

Tegmina longitudinally bicolored; hind margin of pronotum very feebly emarginate; frontal costa plane, or depressed only just below the ocellus (female).

2. *peninsulac* (p. 28).

1. *BARYTETTIX CRASSUS*, new species.

(Plate II, fig. 10.)

Luteo-testaceous, probably flavescens in life, marked with fuscous and black. Head subluteous, a little infuscated on vertex and with a fuscous band behind the eye distinct only at its upper margin; borders of fastigium and frontal costa punctate; other parts of face very obscurely and sparsely punctate; frontal costa sulcate throughout, antennae luteo-testaceous, becoming infuscated on the apical half. Prozona luteo-testaceous above, luteous on the lower half of the lateral lobes, their upper half occupied by a broad piceous patch which narrows anteriorly by the excision of its lower margin; metazona fusco-testaceous; epimera black. Tegmina blackish fuscous with dull luteous veins. Fore and middle legs luteo-testaceous, the apical half of the claws black, the arolia much more than half as long as the last tarsal joint, narrowly edged with black (hind legs wanting). Abdomen with a narrow laterodorsal dark fuscous stripe on some of the basal segments, and most of the segments dorsally margined posteriorly with testaceous. Supraanal plate of male triangular with sinuous sides, either longitudinal half broadly and deeply sulcate, the rising margins between them inclosing a deep and rather narrow median sulcus, constricted at the middle; furcula consisting of a pair of approximate, very small, rounded lobes, scarcely projecting; cerci very broad and compressed, a little narrowed before the middle, the basal portion a little bullate, the apical produced by its inferior extension, the apex acutely angulate and curved downward, the whole very feebly incurved; upper margin of the subgenital plate straight throughout, well rounded apically, the tubercle very coarse and very blunt, nearly doubling the length of the plate.

Length of body, male, 21.75 mm.; antennae, 11 mm.; tegmina, 4 mm.

One male. San Jose del Cabo, Lower California, G. Eisen, collection California Academy of Sciences (L. Bruner).

2. *BARYTETTIX PENINSULAE*, new species.

Light testaceous with a luteous tinge, marked with black. Head testaceous with a faint ferruginous tinge, marked above with a median more or less broken, black stripe which follows the sulcus of the fastigium and broadens considerably behind; also with a very broad black band behind the eyes; whole face and lower portion of the genae distinctly but sparsely punctate, the frontal costa feebly convex except for a slight depression below the ocellus; antennae light ferruginous on basal, ferruginous on apical half. Metazona testaceous with a luteous but a feeble olivaceous tinge, the prozona luteo-testaceous marked on disk with a couple of narrow, parallel, subdorsal black lines on its posterior half, which cross also the metazona, but are then evanescent and slightly divergent; lateral lobes of the prozona marked

above by a broad, slightly oblique, fusco-piceous patch which fails to reach the anterior border; pleural incisures and metathoracic epimera marked in black. Tegmina black on more than the lower half, above pallid luteous. Fore and middle legs luteo-testaceous; hind femora pallid luteous, the entire geniculation except most of the lower lobe black; hind tibiae long pilose, brownish luteous excepting the under surface which is brownish fuscous, the spines black excepting their inner bases. Abdomen with a narrow mesial black stripe widening on each segment at its extremity and cut by the testaceous carina; sides of some of the apical segments partly blackish fuscous.

Length of body, female, 19 mm.; antennae, 7.5 mm.; tegmina, 3 mm.; hind femora, 12 mm.

One female. Lower California, G. Eisen, collection California Academy of Sciences (L. Bruner).

7. PHAULOTETTIX, new genus.

(*φαῦλος*, good-for-nothing; *τέττιξ*, grasshopper.)

Body compact, compressed, pilose. Head not prominent, not wider, including the eyes, than the broadest part of the thorax, the vertex gently arched, not elevated above the pronotum, the fastigium rapidly descending, the face retreating slightly; eyes large but not very prominent, more than half as long again as broad in the male and nearly twice as long as the anterior infraocular portion of the genae, separated above by a very narrow space; frontal costa narrow, but wider than the space between the eyes, equal, percurrent, sulcate; antennae only a little longer than head and pronotum together. Pronotum truncate at each extremity, barely broader behind than in front, transversely convex, the disk passing insensibly into the vertical lateral lobes, a slight median carina; prozona transverse, slightly less than twice as long as the metazona, divided in the middle by a distinct transverse sulcus, followed at a short distance behind by a less distinct sinuous sulcus, very feebly and sparsely punctate in distinction from the densely though not sharply punctate metazona. Prosternal spine short, blunt, conical, retrorse; interval between mesosternal lobes subquadrate, the metasternal lobes attingent over a short space. Tegmina present as minute pads scarcely extending beyond the pronotum, situated high upon the sides. Fore and middle femora scarcely tumescent; hind femora very short and moderately stout, the hind tibiae with 9 spines in the outer series. Abdomen strongly compressed, the tip scarcely enlarged as seen from above, upturned only by its inferior curve; margins of the subgenital plate not ampliate at the base, straight, well rounded and entire apically, extending beyond the tip of the supraanal plate by about half the length of the latter; furcula minute; cerci simple, compressed laminate, tapering, inferiorly angulate at apex.

As only the male is known to me, the description is necessarily based on that sex only.

A single species is known, from Mexico.

PHALLOTETTIX COMPRESSUS, new species.

(Plate II, fig. 11.)

Brownish testaceous above, olivaceo-testaceous below, marked on the sides with a feebly arcuate piceous stripe. Head dark brownish testaceous above, with a piceous band behind the eyes, below which the posterior parts of the genae are ferruginous, while the face and rest of the head are olivaceo-testaceous; frontal costa punctate above; fastigium very narrowly and slightly sulcate; antennae flavescens, growing fuscous apically. Pronotum dull olivaceo-testaceous on disk, with a large median, fusco-ferruginous, trapezoidal patch, the upper half of the lateral lobes blackish, the lower flavo-testaceous, excepting the dark lower part of the front half of the prozona; sides of the abdomen with a diminishing piceous band, broken by the pink incisures, the middle of the dorsum becoming gradually brownish testaceous. Tegmina testaceous. Fore and middle legs and hind femora green, the latter fuscoluteous above, blackish on the sides of the geniculation, and luteous within; hind tibiae red with a green base, the spines pallid, black-tipped. Supraanal plate long triangular, well rounded at apex, strongly tectate, with a moderately deep basal median sulcus, less than half as long as the plate; furcula consisting of a pair of minute, attingent, parallel fingers, hardly longer than broad; cerci slender, compressed, short, tapering on the basal half, beyond equal, the lower outer extremity acutangulate (hardly so represented in the figure).

Length of body, male, 15 mm.; antennae, 6.1 mm.; hind femora, 8.6 mm.

One male. Montelovez, Cohahuila, Mexico, September 20, E. Palmer.

8. CEPHALOTETTIX, new genus.

(κεφαλή, head; τέττιξ, grasshopper.)

Body subcylindrical with subparallel sides, slightly constricted in the middle of the abdomen. Head large, prominent, well exerted, together with the eyes considerably broader (at least in the male) than any part of the thorax; vertex well arched, elevated above the pronotum, the fastigium rapidly descending, and the face considerably retreating, these two at right angles; eyes very large and very prominent (in the male) very broadly ovate, and yet nearly twice as long as the infraocular portion of the genae; fastigium broadening considerably in front of the eyes, sulcate throughout, the frontal costa considerably broader than the interval between the eyes, yet not very broad, equal except for a slight contraction above, feebly depressed just above the ocellus; antennae slender, about half as long as the body. Pronotum parallel sided, scarcely widening at the metazona, the front and hind margin as in *Rhabdotettix*, compressed cylindrical, with neither median nor lateral carinae, the disk passing insensibly into the lateral lobes; prozona sparsely punctate, about twice as long as the densely punctate meta-

zona, divided in the middle by a feeble, straight, transverse sulcus, followed at scarcely less than halfway to the metazona by a similar sulcus. Prosternal spine erect, rather long, pyramidal, acuminate; interval between mesosternal lobes feebly transverse, almost as wide as the lobes themselves, the metasternal lobes subcontiguous. Tegmina elliptical, about as long as the prozona. Fore and middle femora tumescent in a slight degree; hind femora short and moderately stout, the hind tibiae with nine spines in the outer series. Extremity of the abdomen subclavate, well rounded, upturned, the margins of the subgenital plate of male with no basal ampliation, straight, the apex broadly rounded, protruding beyond the tip of the supraanal plate by less than half the length of the latter; furcula wanting; cerci compressed, slender, subequal and nearly straight.

The female being unknown, the description is based wholly upon the male.

The genus is represented by a single species found in Mexico.

CEPHALOTETTIX PARVULUS, new species.

(Plate III, fig. 1.)

Pezotettix parvulus McNEILL!, MS.

Pezotettix olivaceus BRUNER!, MS.

Blackish or fuscous bronze green above, olivaceous yellow below, rather sparsely and not briefly pilose. Head above and sides to the lower level of the eyes bronze green, becoming blackish above, with the feeblest sign of a light-colored stripe behind the upper margin of the eye; rest of head with face olivaceous yellow, feebly infuscated and sparsely punctate; antennae olivaceous at base, testaceous beyond and infuscated at tip. Pronotum wholly and almost uniformly dark bronze green, a little darker above than on the lateral lobes, and slightly darker on prozona than on metazona. Abdomen above fusco-olivaceous, more or less ferruginous at the ends of the segments. Tegmina testaceous. Fore and middle legs and hind femora olivaceous yellow, the upper surface of the latter becoming fuscous in the apical half, the whole geniculation blackish; hind tibiae green, the spines blackish brown except at base. Supraanal plate of male triangular, broadly tectiform except apically, the summit of the tectate portion with a rather deep, slightly narrowing, basal sulcus half as long as the plate; furcula absent; cerci slender, compressed but not laminate, tapering slightly at the base, beyond equal, straight, feebly incurved and bluntly rounded at the tip, angulate below.

Length of body, male, 13.25 mm.; antennae, 6.75 mm.; tegmina, 2.5 mm.; hind femora, 8.5 mm.

Two males. Otoyac, Vera Cruz, Mexico, 2,700 feet, December (L. Bruner); Orizaba, Mexico, 4,000 feet, W. S. Blatchley (J. McNeill).

I have preferred McNeill's name to Bruner's because the latter has and the former has not been employed in closely related genera.

9. RHABDOTETTIX, new genus.

(ῥάβδος, a stick; ῥέττιξ, grasshopper.)

Paraidemona (pars) BRUNNER, Rév. Syst. Orth. (1893), p. 145.

Body more or less pilose, of much the same shape as in *Paraidemona*, at least in the male; that of the female differs only in being a little shorter. Head not prominent, not wider including the eyes than the broadest part of the pronotum; vertex very feebly arched, scarcely elevated above the level of the pronotum and in the male not above that of the eyes, the fastigium rather rapidly declivent, narrow (female) or very narrow (male) between the eyes, broadening in front, sulcate between the eyes in the female, throughout in the male; frontal costa contracted only at the extreme summit, elsewhere equal, broader than the interspace between the eyes but not very broad, slightly sulcate; eyes moderately prominent in the male, much larger than (male) or about as large as (female) the whole infraocular portion of the genae; antennae rather slender, fully half as long as the body (male) or simply longer than head and pronotum together (female). Pronotum very slightly (male) or distinctly (female) enlarging from in front backward, the front margin not in the least flaring to receive the head, the hind margin biconvexly truncate, being slightly emarginate in the middle with very broadly convex halves, more distinct in the female than in the male; disk nearly plane, but very broadly convex transversely, with well rounded angles in passing into the vertical lateral lobes, and a very feeble, blunt, median carina; prozona about twice as long as the metazona, sparsely punctate especially in the female, the metazona densely punctate, the transverse sulci of the former much as in *Sinaloa*, but slightly more distant. Prosternal spine short, erect, conical; mesosternal lobes separated by an interval which is distinctly longer than broad in the male, subquadrate in the female, the metasternal lobes contiguous or subcontiguous (male) or moderately distant (female). Tegmina elliptical, lateral, about as long as the prozona. Fore and middle femora distinctly tumid in the male; hind femora short and moderately stout, the hind tibiae with 8-11, generally 9, spines in the outer series. Extremity of the male abdomen subelavate, upturned, the margin of the subgenital plate with no basal ampliation, straight or very feebly sinuate, the apex rounded and not angulate, protruding beyond the tip of the supraanal plate by less than half the length of the latter; furcula consisting of a pair of exceptionally broad lobes scarcely protruding beyond the margin of the last dorsal segment; cerci compressed, moderately broad, subequal and arcuate or subarcuate.

R. palmeri may be taken as the type.

The genus is known only from Texas and Mexico, where three species occur.

ANALYTICAL KEY TO THE SPECIES OF RHABDOTETTIX.

A¹. Sides of the disk of the pronotum with a narrow light colored stripe, rather indistinguishable from the rest of the disk, followed, on the upper portion of the lateral lobes, by a broad dark stripe; cerci of male not narrowed before the middle.

- b*¹. Interspace between the mesosternal lobes of male about twice as long as broad, the lobes rounded on their inner margin; cerci of male feebly and regularly incurved throughout, almost half as broad as the supraanal plate..... 1. *concinus* (p. 33).
- b*². Interspace between the mesosternal lobes of male only a little longer than broad, the sides parallel; cerci of male bent distinctly inward on apical third, much less than half as broad as the supraanal plate..... 2. *palmeri* (p. 34).
- A³. Sides of the disk and of the upper half of the lateral lobes of the pronotum with no distinct stripes; cerci of male narrowed before the middle..... 3. *pilosus* (p. 35).

1. RHABDOTETTIX CONCINUS, new species.

(Plate III, fig. 2.)

Body very sparsely but not briefly pilose, brownish testaceous above, luteo-testaceous below, marked with blackish castaneous and dull luteous and more or less tinged with ferruginous. Head luteo-testaceous, profusely and delicately mottled with fuscous on face and genae, the vertex black or blackish castaneous, bounded by a narrow luteous stripe behind the upper part of the eyes, separating from it a broad black or blackish band behind the middle of the eyes, which again is followed by a broad luteous patch behind the lower part of the eyes; face, including frontal costa and the front of the genae, sparsely punctate; antennae luteo-testaceous more or less infuscated. Pronotum with a very broad, median, blackish castaneous band crossing the prozona, separated from an equally broad, similar, percurrent, posteriorly widening band on the upper half of the lateral lobes (but here less pure) by a rather narrow dull luteous stripe, the continuation of that behind the upper part of the eyes; metazona mostly ferrugineo-testaceous; rest of the body blackish castaneous above, with a broad, irregularly margined, broadening, dull luteous or luteo-ferruginous, median stripe; lower portion of lateral lobes of the pronotum luteous or luteo-testaceous. Tegmina black in the interstices of the pale testaceous veins. Fore and middle femora greenish with a very strong ferruginous tinge above; hind femora ferruginous above, yellowish luteous beneath, the outer face olivaceous more or less infuscated above, the genicular are piceous; hind tibiae olivaceous green, the apical half of the spines black, ten spines in the outer series. Supraanal plate of male triangular with slightly convex sides, the lateral margins slightly raised, the inner half tectate with a rather deep and slender median sulcus on the summit, extending from the base to the middle of the plate; furcula consisting of a pair of scarcely projecting exceedingly broad plates, each of which is much more than half as wide as its half of the supraanal plate beneath it, separated from each other by a considerable interval; cerci thinly laminate, the outer side slightly convex transversely, pretty broad, the basal half subequal, the apical half bent strongly upward in a curve, the apex rounded, the whole gently incurved, subfalcate; lateral margins of the subgenital plate slightly and broadly convex as seen from the side, falling toward the apex, which is not at all angulate; pallium capable of erection as a high pyramid.

Length of body, male, 15 mm., female, 18 mm.; antennae, male, 9 mm., female, 7 mm.; tegmina, male, 2.75 mm., female, 3.5 mm.; hind femora, male, 10 mm., female, 10.75 mm.

One male, 2 females. Waco, McLennan County, Texas, October 4, 6 (Museum Comparative Zoology); Texas, Belfrage, October 13.

The broader cerci, incurved throughout and not abruptly bent inward apically, separate this species clearly from *R. palmeri*. In one view their base may be said to be narrower than the apical portion and so the description of Stål's species would be applicable to this, but the interval between the mesosternal lobes of the male is here nearly twice as long as broad, while in *R. pilosus* it is more nearly quadrate.

2. RHABDOTETRIX PALMERI, new species.

(Plate III, fig. 3.)

Body thinly but not briefly pilose, luteo-testaceous beneath, black or blackish ferruginous (male) or ferrugineo-testaceous (female) above, marked with dull luteous; the darker parts are found in a dorsal stripe from the front of the vertex to the front of the metazona, on the upper half of the lateral lobes of the pronotum, and on the sides of the abdomen. Head luteo-testaceous, more or less deeply infuscated; frontal costa feebly punctate above; antennae luteous or testaceous apically infuscated. Pronotum with the dark portions mentioned separated by a narrow light stripe, which begins behind the upper part of the eyes and on the head is bright luteous, but in passing over the pronotum, especially in the female, becomes much duller and is sometimes scarcely distinguishable; in most vivid examples it crosses the pronotum, but even in the male it usually becomes obsolescent on the metazona, which is mostly ferrugineo-testaceous in both sexes, rarely black mesially in the male; the lateral stripe on the pronotum generally margined more or less distinctly with black; lower portions of lateral lobes luteous or luteo-testaceous, narrowly edged beneath with testaceous; abdomen with a widening dorsal stripe of ferrugineo-testaceous. Fore and middle femora ferruginous, slightly infuscated apically; hind femora green, ferruginous above, the upper genicula lobe and sometimes the whole geniculation black; hind tibiae green, the spines black-tipped, usually nine but varying from nine to eleven in the outer series. Supraanal plate of male triangular with slightly convex sides, which are slightly elevated and separated by a broad valley from the median tectate portion; the latter is considerably elevated and carries a deep slender median sulcus more than half the length of the plate; furcula consisting of a pair of broad plates, which advance beyond the posterior line of the last dorsal segment is scarcely perceptible, each about a quarter the basal width of the supraanal plate; cerci moderately broad, compressed, straight and slightly diminishing in size for about two-thirds their length, then suddenly and considerably curved inward and bent upward, narrowing more rapidly and

ending roundly; lateral margins of the subgenital plate almost straight, the apex well rounded; pallium capable of a considerable pyramidal erection.

Length of body, male, 13 mm., female, 18 mm.; antennae, male and female, 6 mm.; tegmina, male, 2.75 mm., female, 3.2 mm.; hind femora, male, 8 mm., female, 10.5 mm.

Light males, 12 females. Montelovez, Cohahuila, Mexico, September 22, E. Palmer. [U.S.N.M. No. 704, male and female.]

The antennae of the male are scarcely so long in this species as in the others; it differs decidedly from *R. concinnus* in the bent and narrow cerci as well as in the more nearly quadrate interspace between the mesosternal lobes of the male; from *R. pilosus*, to which it seems more nearly allied and for which I at first mistook it, it differs in the cerci of the male, which do not narrow before the middle, in being a smaller insect, besides having a duller coloring with more contrasted markings, to judge from Stål's description.

3. RHABDOTETTIX PILOSUS.

Pezotettix pilosus STÅL, Bih. Sv. Vet.-Akad. Handl., V, No. 9 (1878), pp. 10-11.

Paraidemona pilosa BRUNNER, Rév. Syst. Orth. (1893), p. 145.

I have not seen this species, and accordingly give Stål's description, Englished. The description is mainly a comparative one, the basis of comparison being *Aidemona azteca*, next which Stål placed it, in the same section of *Pezotettix*.

Olivaceous; legs yellowish olivaceous; hind tibiae greenish olivaceous, the base and geniculation proper of the hind femora black; tegmina rudimentary. Length of male 16 mm.

Male.—Interspace between mesosternal lobes a little longer than broad, with parallel sides, much narrower than the lobes themselves; metasternal lobes subcontiguous; eyes large, rather convex; apical margin [of the pronotum] gradually and obtusely sinuate, slightly emarginate in the middle, destitute of a lobe; supraanal plate furnished with a gradually narrowing sulcus, extending beyond the middle of the plate; cerci gently curved, compressed and rather broad throughout, before the middle slightly narrowed; subgenital plate short, very strongly recurved; abdomen posteriorly tumescent and somewhat recurved.

Distinguished from *Aidemona azteca* by the front and prozona less densely punctate, frontal costa obtusely subsulcate, narrower between the antennae, the sides parallel but slightly narrowed at the base, the interspace between the eyes narrower, the disk of the pronotum smooth, abbreviate and truncate anteriorly, the metazona about half as long as the prozona, tegmina rudimentary, widely separated, elliptical, extending slightly beyond the median segment, shorter than the pronotum, the abdomen blunter at tip, posteriorly more tumid and recurved, the cerci broader, the last dorsal segment of the abdomen

with no obtuse apically emarginate lobe [furcula], the hind femora slenderer and longer, prosternal spine conical, and the antennae longer, more than half as long as the body; hind tibiae in the specimen described furnished exteriorly with eight black spines, greenish olivaceous at the base.

A female specimen, in which the dorsum of the body and of the hind femora are ferruginous, with smaller eyes, the interspace between the mesosternal lobes subtransverse and scarcely narrower than the lobes themselves, and metasternal lobes moderately distant, is very probably to be referred to the species described above. In this specimen the antennae are mutilated and the hind tibiae armed exteriorly with nine spines.

Mexico (Brunner's collection).

To this I may add that the present species is certainly very close to the others described above under this genus, but seems to be slightly larger than either, and to differ by the cerci of the male to a greater degree than either of these do from each other. It is evidently also of a lighter color, and no mention is made by Stål of a very distinct dark lateral band, which is characteristic of the other two.

10. CYCLOCERCUS, new genus.

(κύκλος, circle; κέρκος, tail.)

Body shaped much as in *Paraidemona*, male and female, rather sparsely and not very briefly pilose. Head not prominent, the vertex moderately arched, scarcely elevated above the pronotum, but the fastigium rapidly descending, more or less sulcate especially in the male, much broadened anteriorly; face moderately retreating, the frontal costa generally more or less sulcate and broadening slightly from above downward, generally percurrent; interval between the eyes narrow (male) or rather narrow (female), generally narrower than the upper part of the frontal costa; eyes moderately prominent, especially in the male, generally much (male) or scarcely (female) longer than the posterior infraocular portion of the genae; antennae much (male) or scarcely if at all (female) longer than the head and pronotum together. Pronotum scarcely (male) or considerably (female) enlarging from in front backward, both front and hind margins truncate, the latter sometimes slightly emarginate, the surface transversely convex with feeble or no median carina and no lateral carinae, the disk passing almost insensibly into the vertical lateral lobes; prozona about twice as long as the metazona and less closely and less regularly punctate, the transverse sulci as in *Sinaloa*. Prosternal spine erect, blunt, conical; interval between mesosternal lobes at least as long as broad in the male, little transverse in the female, the metasternal lobes attingent or subattingent in the male, approximate in the female. Tegmina shorter than the pronotum, lateral, linear. Fore and middle femora distinctly more gibbous in the male than in the female; hind femora rather short

and stout, the outer margin of the hind tibiae with nine or ten spines. Extremity of abdomen bluntly rounded (whence the generic name), the lateral margins of the subgenital plate straight from the very base, in no way angulate on meeting apically, but protruding beyond the apex of the supraanal plate by more than half the length of the latter; cerci conical, acuminate, sometimes with an inferior median tooth; furcula wholly wanting.

Three species occur in northern Mexico and southern Texas.

C. bistrigata may be taken as the type. *C. valga* is somewhat aberrant, and should perhaps be separated generically.

ANALYTICAL KEY TO THE SPECIES OF CYCLOCERCUS.

- A.¹ Interspace between mesosternal lobes of male nearly twice as long as broad; anal cerci of male slender, simple.
- b.¹ Hind femora relatively stout; upper surface of body with a distinct bright stripe running from the upper margin of the eye backward over the region of the lateral carinae on each side..... 1. *bistrigata* (p. 37).
- b.² Hind femora relatively slender; upper surface of body with at most an obscure stripe in the region specified..... 2. *accola* (p. 38).
- A.² Interspace between mesosternal lobes of male subquadrate; cerci of male stout, with an inferior median tooth..... 3. *valga* (p. 39).

1. CYCLOCERCUS BISTRIGATA, new species.

(Plate III, fig. 4.)

Dark almost blackish chocolate brown, striped with bright yellow testaceous. Head testaceous, often clouded, occasionally mottled, with fuscous, the summit to below the middle of the eyes posteriorly blackish brown, with a narrow but widening testaceous stripe behind the upper half of the eyes; lateral margins of the fastigium, particularly between the eyes, elevated to a rounded ridge, more prominent and rounded in the male than in the female, reversely arcuate; frontal costa moderately broad, subequal, sulcate (more deeply in the male than in the female), above feebly punctate at the sides, occasionally obsolescent at base in the female; lateral carinae of face distinct, slightly divergent; antennae testaceous. Both prozona and metazona ruguloso-punctate in the male, the prozona coarsely, bluntly and rather sparsely punctate in the female; pronotum with the postocular testaceous stripe of the head continued, in the male as a slender, sharply defined stripe across both prozona and metazona, in the female as a slightly broader stripe across or nearly across the prozona only, fading posteriorly and less sharply defined above; episterna testaceous; meso- and metathorax and abdomen of male blackish above, with a broad mediadorsal testaceous stripe, and testaceous below; of female more or less blackish along the middle of the sides, sometimes margined above with a broad, posteriorly evanescent, often broken, testaceous stripe, generally almost or quite obsolete, the dorsum proper brown. Interval between the mesosternal lobes of male nearly twice as long as broad. Tegmina slender, linear, very slightly and regularly enlarging to the well rounded tip, about as

long as the prozona. Hind femora rather stout, olivaceo-ruddy brown, sometimes fulvo-testaceous, the incisures of the outer face fuscous, the apex more or less infuscated; hind tibiae glaucous, the apical half of the spines black. Supraanal plate of male broadly triangular, with slightly convex sides and roundly angulate apex, with a shallow basal median sulcus, bordered by slightly elevated broad walls; furcula wholly absent, the last dorsal segment emarginate in the middle; cerci tapering rather rapidly in the basal two-fifths, beyond very slightly tapering, very slender, subacuminate, straight, reaching the top of the supraanal plate.

Length of body, male 16 mm., female 19.5 mm.; antennae, male, female, 8 mm.; tegmina, male 3 mm., female 3.5 mm.; hind femora, male, 11 mm., female 11.5 mm.

One male, 4 females. Venis Mecas, San Luis Potosi, Mexico, June 6, E. Palmer; Mt. Alvarez, San Luis Potosi, Mexico, E. Palmer; Sierra Nola, Tamaulipas, Mexico, December 3-6, E. Palmer.

It is possible that the male, which comes from Venis Mecas, may be distinct from the females, which come from all the localities; in that case the name should be retained for the male as the most characteristic form.

2. CYCLOCERCUS ACCOLA, new species.

(Plate III, fig. 5.)

With the same general color and markings as *C. bistrigata*, but without the distinct carinal stripe of that species. Head testaceous, blackish above, with a little of the postocular stripe in the female; fastigium distinctly sulcate, broadening in front; interspace between the eyes slightly narrower than in *C. bistrigata*, the frontal and lateral costae as there; antennae fusco-testaceous. Prozona with coarse dull punctation in the female, transversely ruguloso-punctate in the male, the metazona in both closely punctate; posterior margin of prozona faintly emarginate, the sulcus dividing the lobes being slightly angulate; dorsum of pronotum darker or lighter testaceous, the lower portion of the lateral lobes flavo-testaceous, the upper portion blackish brown, forming part of a broad, dark, arcuate belt, more sharply defined below than above, which passes down over the mesothoracic epimera; abdomen testaceous, with a broad piceous lateral band on its proximal half. Interspace between mesosternal lobes of male nearly twice as long as broad. Tegmina fusco-testaceous. Hind femora rather slender, fusco-testaceous, yellowish on inner face, much infuscated and sometimes strongly tinged with bluish green on outer face, the geniculation wholly testaceous; hind tibiae testaceous at extreme base, the remainder bluish green, the spines pallid on basal, black on apical, half. Supraanal plate small, triangular, with roundly pointed apex, and a short deep basal sulcus, bounded by high rounded walls; furcula wanting; cerci small, slender, shorter than the supraanal plate, tapering gently in basal half, beyond equal or subequal, very slender, blunt tipped, straight.

Length of body, male, 12.5 mm., female, 21 mm.; antennae, male, 6.5 mm., female, 7.5 mm.; tegmina, male, 2 mm., female, 3.5 mm.; hind femora, male, 8 mm., female, 11.5 mm.

Two males, one female. Corpus Christi Bay, Nueces County, Texas, December 11-20, E. Palmer; Lerdo, Durango, Mexico, December (L. Bruner).

3. CYCLOCERCUS VALGA, new species.

(Plate III, fig. 6.)

Brownish testaceous with blackish and dull luteous markings. Head dull luteo-testaceous, the whole summit of the head to below the middle of the eyes posteriorly blackish, with a narrow and somewhat obscure luteous stripe on either side, following the sides of the entire fastigium around the eyes to the middle and then passing backward, continuing across the prozona on the upper margin of the lateral lobes; fastigium feebly sulcate between the eyes, which are separated by a narrow space, much narrower than the rather broad and subequal frontal costa; this becomes obsolescent below and is shallowly sulcate in the middle and sparsely and feebly punctate throughout, like the rest of the face and the genae; antennae luteo-testaceous. Pronotum with a broad blackish fuscous dorsal stripe, crossing the whole prozona between the luteous stripes mentioned, coarsely and feebly rugoso-punctate; metazona finely and closely rugoso-punctate, rufo-testaceous; lateral lobes pallid luteous below, crossed above by a very broad mixed luteo-castaneous and blackish band, greatly broadening and weakening on the metazona, where it becomes rufo-testaceous; episterna pale greenish luteous; epimera subpiceous. Interspace between mesosternal lobes of male subquadrate. Tegmina dark fuscous with luteous veins, about as long as the prozona, linear, slightly and regularly enlarging to the rounded apex. Hind femora flavo-luteous like the under surface of the abdomen, pale rufo-testaceous above, the outer field with a bluish green upper margin, the whole geniculation pale rufo-testaceous; hind tibiae feebly incurved apically (whence the specific name), blue-green with a testaceous base, the apical half of the spines black. Supraanal plate of male shield-shaped, with strongly sinuous sides, much longer than broad, with a rather narrow sulcus on the basal half, bounded by slight ridges; furcula wanting and the last dorsal segment parted in the middle; cerci somewhat tumid and large at base, tapering rapidly in the basal half, the apical half laminate, tapering, acuminate, with an inferior dentation at its base.

Length of body, male, 18.5 mm.; antennae, 8.5 mm.; tegmina, 4 mm.; hind femora, 11.25 mm.

One male. Sierra Nola, Tamaulipas, Mexico, December 3-6, E. Palmer.

This species differs widely from the two preceding.

11. SINALOA, new genus.

(Geographical name.)

Body shaped much as in *Paraidemona*, male and female, briefly pilose. Head a little prominent, the vertex well arched and the fastigium rather rapidly descending, shallowly sulcate, the frontal costa not very broad, about as broad as the interval between the eyes, subequal, percurrent, sulcate; face but little retreating; eyes separated by a tolerably narrow interval, narrower in male than female, rather prominent in the male, considerably (female) or very much (male) longer than the anterior infraocular portion of the genae; antennae moderately stout, in the male much longer than the head and pronotum together. Pronotum subequal in the male, but with slightly expanding front margin and metazona, distinctly enlarging posteriorly in the female, both front and hind margin truncate, the latter feebly emarginate, with slight percurrent median carina and no lateral carinae, the lateral lobes vertical; prozona almost twice as long as, and less feebly punctate than, the metazona, cut in the middle by a transverse sulcus, followed behind by a sinuous or broadly W-shaped sulcus, both tolerably distinct. Prosternal spine erect, conical, bluntly pointed; interval between mesosternal lobes feebly transverse in both sexes, the metasternal lobes not very close. Tegmina brief, lobiform, lateral. Fore and middle femora of male tumid; hind femora moderately long but stout, the spines of the outer row of hind tibiae ten to eleven in number. Margin of subgenital plate of male straight from the base, which is in no way ampliate; cerci compressed laminate, subequal, slender; furcula consisting of a pair of parallel, attingent, slender, spine-like processes.

The only species known is from Mexico.

SINALOA BEHRENSII, new species.

(Plate III, fig. 7.)

Body fusco-testaceous above, flavo-testaceous beneath, the two colors separated on the sides by a broad blackish-fuscous band, extending from behind the eyes across the lateral lobes of the pronotum, subequal and well defined throughout but, at least in the female, slightly enlarged and a little obsolescent on the metazona, continued, at least in the male, on the sides of the base of the abdomen. Head flavo-testaceous, with a mediodorsal, widening, blackish fuscous or dull fuscous stripe from the base of the fastigium backward, sometimes broken; face with extremely feeble signs of delicate puncta, no more abundant on the frontal costa than elsewhere; antennae flavo-testaceous, growing infuscated apically. Pronotum with the metazona transversely and subrugosely punctate, especially in the male and on the lateral lobes, simply punctate on the disk in the female, transversely striate in the region of the lateral carinae on the prozona, the median carina sometimes blackish fuscous in continuation of the stripe on the head. Tegmina fusco-testaceous, somewhat darkest on anterior half, hardly so long as the prozona,

rounded acuminate at tip, fully twice as long as broad. Hind femora flavo testaceous, the angulate incisures of the outer face rather broadly fuscous; hind tibiae flavous or flavo-testaceous, the spines black excepting their base. Supraanal plate of male short triangular, with feebly convex sides, rectangulate apex, and with a pair of short, oblique, rather prominent, rounded ridges before the middle of the basal half of either side; furcula consisting of cylindrical, equal, blunt fingers fully a third the length of the supraanal plate; cerci compressed laminate, rather slender, narrowed in the middle by the arcuation of the upper margin, bluntly rounded at tip, gently incurved throughout, and hardly so long as the supraanal plate; apex of subgenital plate a little angulate, extended no great distance beyond the supraanal plate.

Length of body, male, 16.5 mm., female, 25 mm.; antennae, male, 9.25 mm.; tegmina, male, 3 mm., female, 4 mm.; hind femora, male, 11 mm., female, 15 mm.

One male, 1 female. Sinaloa, Mexico, collected by Koels; received from J. Behrens, of San Francisco, after whom it is named.

12. PARAIDEMONA.

(παρά, beside; Aideмона, a genus of Melanopli.)

Paraideмона BRUNNER (pars), Rév. Syst. Orth. (1893), p. 145.

Body compact, not slender, subcylindrical, a little compressed, slightly enlarged at the metathorax, especially in the female, the abdomen of the male feebly clepsydral, the apex tumescent and rounded, and somewhat recurved. Head not prominent, the vertex well rounded, the eyes separated narrowly in the male, not widely in the female, rather prominent, particularly in the male, and large, much larger than the infraocular portion of the genae, subangulate above in the female; antennae very much longer than head and pronotum together, especially in the male. Pronotum truncate at both extremities, enlarging very slightly posteriorly, more in the female than the male, with slight, percurrent, median carina, no lateral carinae; prozona twice as long as the metazona, both equally and somewhat similarly punctato-rugulose, the transverse sulci of the prozona lightly impressed, one of them dividing the prozona in equal halves and percurrent. Prosternal spine moderate, blunt, conical, erect; interval between mesosternal lobes of male longer, sometimes much longer, than broad; of female (where known) a little longer than broad; metasternal lobes narrowly attinent. Apterous in both sexes. Fore and middle femora of male distinctly tumescent; hind femora not very long. Lateral margins of subgenital plate straight from the base, which is not ampliate and is concealed behind the preceding segment; cerci styliform, conical; furcula consisting of a pair of parallel, attinent, cylindrical processes, terminating bluntly.

As here restricted, *Pezotettix punctatus* Stål is the type.

The genus is confined to Texas and northern Mexico, so far as known.

ANALYTICAL KEY TO THE SPECIES OF PARAIDEMONA.

- Supraanal plate of male, excepting the tip, subquadrate, the lateral margins rectangular..... 1. *punctata* (p. 42).
 Supraanal plate of male triangular with nearly straight sides.... 2. *mimica* (p. 43).

1. PARAIDEMONA PUNCTATA.

(Plate III, figs. 8, 9.)

Pezotettix punctatus STÅL, Bih. K. Sv. Vet.-Akad. Handl., V, No. 9 (1878), p. 11.*Pezotettix nudus* SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), p. 77; Cent. Orth. (1879), p. 66.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.*Paraideмона punctata* BRUNNER, Rév. Syst. Orth. (1893), p. 145.

Interspace between eyes as broad as (male) or rather broader than (female) the first antennal joint; frontal costa moderate, equal, flat above, sulcate at, below, and to some extent a short distance above, the ocellus. Pronotum expanding a very little posteriorly, mostly on the posterior half, the front and hind margins truncate, the latter sometimes almost imperceptibly emarginate in the middle, especially in the male, the lateral carinae wholly wanting; the whole pronotum is equally subrugoso-punctate throughout, unless it be that the disk is coarser than the deflected lobes; meso- and metanota, and the basal segments of the abdomen similarly but more obscurely punctured. The general color is a greenish yellow more or less tinged with brown, brighter in the male than in the female, and marked with blackish fuscous; the darker markings consist, principally, of a dorsal stripe, which either extends over the pronotum as a broad equal band, often fainter in the middle, with a triangular extension on the head, and sometimes a narrowing infuscation on the meso- and metanota (male), or forms an obovate patch along the middle of the anterior lobe of the prothorax, with the same triangular extension on the head, and reappears sometimes on the meso- and metathorax, and always on the abdominal joints, as a series of obliquely-descending, triangular, lateral patches, separated from one another by a yellowish median line (female); also of a broad lateral band, which extends from behind the eye backward, either to the hinder edge of the prothorax, its upper margin straight, its lower arcuate (male), or across the prozona only, occasionally in an obscure manner across the metazona also, both margins arcuate (female); beyond this the lateral band extends over the remainder of the thorax and over the abdomen, often broken into spots on the latter, and always enlivened on the former by an oblique yellowish line, which crosses it on the metathoracic episterna. The face partakes of the color of the under surface, as do the bases of the antennae; beyond, the antennae become slightly rufous; just behind its narrowest point the vertex has a transverse blackish line. Hind femora greenish yellow, the lower portion of their outer face more or less embrowned, deepening frequently into black, which occasionally covers the whole; hind tibiae pale green, the spines black tipped. Subgenital plate of male twice as broad as long, tumid, the upper edge a little and angularly produced in the middle; supraanal

plate nearly quadrate, tapering very slightly, the outer angles slightly produced, and the posterior edge with a median, triangular, pointed extension, a third as wide as the extremity of the plate and longer than broad; furecula consisting of a pair of attingent, depressed, rather stout, scarcely tapering, blunt-tipped fingers, fully half as long as the supraanal plate and slightly upturned at the tip; anal cerci very simple, being slight conical projections, tapering mostly in their basal half, the tip blunt, the whole not so long as the disk of the supraanal plate, omitting its apical extension.

Length of body, male, 16.5 mm., female, 23 mm.; antennae, male, female, 8 mm.; hind femora, male, 10 mm., female, 12.25 mm.

Thirteen males, 21 females. Dallas, Texas, J. Boll; Texas, June 13, 28, 29, July 5, August 3, Belfrage (U.S.N.M.,—Riley collection); Carrizo Springs, Dimmit County, Texas, A. Wadgymer, August 28 (the same); Goliad, Texas, December 3, E. Palmer; Corpus Christi Bay, Nueces County, Texas, December 11–20, E. Palmer. Stål's specimens came from Texas.

2. *PARAIDEMONA MIMICA*, new species.

(Plate III, fig. 10.)

Yellowish testaceous, heavily banded with black, especially on the sides, and more markedly in the male than the female. Head with the interspace between the eyes very narrow, especially in the male, the fastigium between them sulcate, narrowly in the male, the sulcation continuing so as to be subcontinuous with that of the frontal costa, which is sulcate in its whole extent, equal, and broader than the interspace between the eyes. Pronotum punctate as in *P. punctata*, and as there a glabrous spot free of punctuation occurs on the prozona at the summit of the lateral lobes. A black stripe, sometimes wanting or feebly fuscous in the female, begins at some point on the fastigium and continues backward, broadening on the head so as to include nearly the entire vertex, and crosses the pronotum as a broad mediodorsal band, as broad as the length of the metazona, or in the female even broader; it is sometimes obscure or wholly obsolete in the female, while in the male it is always distinct, at least on the prozona, and generally continues, though narrowed, over the meso- and metanota. The lateral band, generally rufo-piceous, is still broader and is sharply defined above and below, often uninterrupted on the metazona in the female, where it widens so as to include behind the whole of the thoracic pleura (excepting the episterna) and the sides of the first four abdominal segments; above it is more or less distinctly accompanied in the female by a testaceous stripe. The dorsum of the abdomen of the female lacks the double series of oblique lateral dashes found in *P. punctata*, or has them very feebly marked. Hind femora yellowish testaceous, the outer face growing darker below, giving there a broken irregular blackish stripe; hind tibiae glaucous, the pallid spines black tipped. Supraanal

plate of male triangular, with the lateral margins slightly convex in the middle (scarcely shown in the figure), with a pair of slightly distant, short, longitudinal, subapical ridges; furecula consisting of a pair of attingent, depressed, equal, parallel, blunt tipped fingers, less than a third as long as the supraanal plate; cerci simple, conical, pointed, hardly half as long as the supraanal plate.

Length of body, male, 13 mm., female, 20 mm.; antennae, male and female, 7 mm.; hind femora, male, 9 mm., female, 10.5 mm.

Four males, 5 females. Fort Worth, Tarrant County, Texas, May, ([No. 705] U.S.N.M.,—Riley collection); Columbus, Colorado County, Texas, June 21 (the same); southwest Texas, Schaupp (L. Bruner); Uvalde, Texas, last week of July, E. Palmer.

This species resembles *P. punctata* to such a degree as with difficulty to be distinguished from it, except by the abdominal appendages of the male, which are remarkably distinct. There is no sign in the female of the dark mediodorsal fusiform patch on the pronotum, and the coloring of the female in both species is very variable.

There are two other forms of *Paraidemona* known to me, which I deem probably distinct from either of the above, but being known only by the female, I only allude to them. Both have relatively heavy hind femora.

One is almost wholly olivaceous, the abdominal carina marked with yellow, and with yellow shades upon the sides of the dorsum of the thorax; it comes from Carrizo Springs, Texas (U.S.N.M.).

The other is almost wholly yellowish testaceous, with no dorsal stripe and relatively feeble and fleeting lateral stripes; it comes from Dallas, Texas (U.S.N.M.), and Venis Mecas, San Luis Potosi, Mexico, January 6, E. Palmer.

13. AIDEMONA.

(αἰδήμων, modest.)

Aidemona BRUNNER, Rév. Syst. Orth., 1893, p. 145.

Body compact, moderately slender, parallel sided but enlarged at the mesothorax. Head not prominent, the vertex well rounded, rising above the level of the pronotum, the space between the eyes narrow but not very narrow, the face broadly rounded and a little retreating; frontal costa a little prominent above, broad, much broader than the interspace between the eyes, plane, percurrent, subequal, and heavily punctate; eyes moderately prominent but little more so in the male than in the female, rather large, broad ovate, much larger than the subocular portion of the genae; antennae slender, rather shorter than the head and pronotum together. Pronotum scarcely enlarging posteriorly, transversely quadrate, the dorsum plane or very feebly convex, with the lateral lobes set sharply at right angles to it, but otherwise with no raised lateral carinae, a feeble median carina on metazona only,

the front margin truncate, the hind margin subrectangulate; prozona and metazona of subequal length, the sulcus separating them distinct but not deep, suddenly angulate in the middle by the emargination of the prozona, the posterior sulcus of the prozona arcuate or angulate so as to approach it in the middle, the middle sulcus subparallel to this but more nearly transverse and crossing the middle of the prozona, the front of the prozona in no way elevated to receive the head. Prosternal spine quadrate, appressed, broadly truncate; interspace between mesosternal lobes subquadrate, a little longer than broad in the male, the reverse in the female, the metasternal lobes attinent over some space (male) or approximate (female). Tegmina and wings fully developed, the former with scarcely any ampliation of the costa near the base. Fore and middle femora but little more gibbous in the male than in the female; hind femora not very long, the hind tibiae with ten spines on the outer side. Margin of subgenital plate of male straight from the base, which is not ampliate, a little elevated at the apex; cerci styliiform, about as long as the supraanal plate, the furcula nearly obsolete.

The genus is confined so far as known to Mexico and Central America.

AIDEMONA AZTECA.

(Plate IV, fig. 1.)

- Platyphyma azteca* SAUSSURE, Rev. Mag. Zool., 1861 (1861), p. 161; Orth. Nov. Amer., II (1861), p. 12.—WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 716.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 223.
Pezotettix aztecus STÅL, Bih. K. Sv. Vet.-Akad. Handl., V (1878), No. 9, p. 10.
Aidemona azteca BRUNNER, Rév. Syst. Orth. (1893) p. 145.

Brownish fuscous above, sometimes deepening to blackish fuscous, especially on the upper half of the lateral lobes of the pronotum, testaceous below, often deeply infuscated. Head mostly testaceous, heavily punctate throughout excepting on the vertex, where the puncta are obscure and subdued, and where the color is dark; fastigium with more or less elevated but rounded lateral walls; frontal costa slightly widened just above the ocellus; antennae testaceous, more or less infuscated, especially toward apex. Pronotum heavily and almost equally punctate throughout, both on dorsum and lateral lobes, but less crowded on the posterior half of the lateral lobes of the prozona, and with a small, free, glabrous patch above on either half of the prozona; lower half of the lateral lobes testaceous, in greater or less contrast to the blackish upper half, the darker portion widening on the metazona; but while this feature is sometimes very marked, in specimens in which the testaceous under surface becomes flavous, it is sometimes scarcely to be detected, so infuscated may the lower half become. Tegmina far surpassing the abdomen, rather slender, well rounded apically, griseous from a profuse and rather minute fuscous flecking on a semi-pellucid base, the flecking more or less confluent in the basal third;

wings pellucid, feebly infuscated apically, the veins and cross veins blackish fuscous. Hind femora very variable, the outer face varying from olivaceo-testaceous with fuscous incisures to dark almost blackish fuscous, the most distinctly marked specimens with the base broadly and obliquely yellowish testaceous, and a middle oblique band of no great width of the same color; inner side red; hind tibiae obscure glaucous, becoming luteous toward the base, rather densely pilose, the spines black-tipped. Supraanal plate of male triangular, rather small, tectate especially apically, with a narrow basal median sulcus, bounded by high and heavy walls, which do not extend over half the plate; furens composed of a pair of very small, rounded, attingent lobes, barely projecting beyond the edge of the last dorsal segment; cerci about as long as the supraanal plate, slender, tapering throughout but slightly more in the basal than the apical half, feebly compressed, acuminate, feebly incurved in the apical half; infracerebral plates brief, concealed.

Length of body, male, 17 mm., female, 21 mm.; antennae, male, 5.5 mm., female, 6 mm.; tegmina, male, 14 mm., female, 18 mm.; hind femora, male, 10 mm., female, 11.75 mm.

Forty-one males, 35 females. Mexico, Sumichrast; Mexico, April, Botteri; Orizaba, Mexico, January (L. Bruner); Venis Mecas, San Luis Potosi, Mexico, January 6, E. Palmer; San Luis Potosi and Savinito, San Luis Potosi, Mexico, E. Palmer; Aguas Calientes, Mexico, L. Bruner; Tehuantepec, Mexico, February, Sumichrast; Realejo, Nicaragua, April, McNeil.

Specimens in my collection, poorly preserved, seem to indicate the presence of two other species of this genus in Mexico, one at Vera Cruz, the other at Tehuantepec.

14. HYPOCHLORA.

(ὕποχλωρος, greenish yellow.)

Hypochlora BRUNNER (pars), Rév. Syst. Orth. (1893), p. 145.

Body slender, compressed, very thinly pilose. Head not prominent, the summit gently arched, the fastigium descending with moderate rapidity, the face retreating considerably; interspace between the eyes broad, the fastigium scarcely sulcate, the frontal costa rather narrow, not nearly so broad as the space between the eyes, sulcate, percurrent, and subequal; eyes moderate in size, not very prominent, similar in the two sexes, about half as long again as broad, and distinctly longer than the anterior infraocular portion of the genae; antennae moderately stout, somewhat longer (male) or a little shorter (female) than the head and pronotum together. Pronotum subequal, even in the female, very feebly and gradually enlarging in passing backward, with a distinct percurrent median carina, the disk very broadly subtectate, passing by a rounded angle hardly forming a lateral carina into the vertical lateral

lobes, the front margin subtruncate, the hind margin very obtusely angulate, the very coarsely, feebly, and sparsely punctate prozona half as long again as the finely and suddenly punctate metazona, its posterior margin faintly angularly emarginate, the transverse sulci feeble, one dividing it into two equal halves and straight, the other a third the way behind it to the metazona and sinuate. Prosternal spine erect, moderately slender, conical; interspace between mesosternal lobes more than twice as long (male), or nearly half as long again (female) as its middle breadth, the shape being strongly clepsydral from the convexity of the inner margin of the lobes, the metasternal lobes subattinent, especially in the male. Tegmina abbreviate, acuminate, attinent or overlapping, about as long as the pronotum. Fore and middle femora slightly tumid in the male; hind femora slender, somewhat compressed, the lower genicular lobe not free from markings, the hind tibiae with nine to ten spines in the outer series. Abdomen of male not clavate nor curved upward apically, the lateral margins of the subgenital plate straight from the very base, acutangulate at tip, with a slight, blunt, apical tubercle; cerci very slender and simple; furcula consisting of a pair of slight cylindrical slender fingers, subparallel or more or less crossing one another, perhaps parallel in life.

This genus was established by Brunner upon three species, one of which must be referred to *Hesperotettix*, since the lateral margins of the subgenital plate are clearly ampliate at the base; while another has here been placed in a near and neighboring genus, *Campylacantha*, leaving *H. alba* as the type and at present the only known member of the genus. It is found in our Western States only, east of the Rocky Mountains, and from Nebraska southward.

HYPOCHLORA ALBA.

(Plate IV, fig. 2.)

Pezotettix alba DODGE!, Can. Ent., VIII (1876), p. 10.—BRUNER!, *ibid.*, IX (1877), p. 144.—THOMAS, Ann. Rep. Chief Eng., 1878, 1845 (1878).—BRUNER!, Rep. U. S. Ent. Comm., III (1883), p. 59; Bull. Div. Ent. U. S. Dep. Agric., IV (1884), p. 58.—RILEY, Stand. Nat. Hist., II (1884), pp. 201-202.—BRUNER!, Bull. Washb. Coll., I (1885), p. 136; Rep. U. S. Ent., 1885 (1886), p. 307.—OSBORN, Proc. Iowa Acad. Sc., I, Pt. II (1892), p. 117.—BRUNER!, Publ. Nebr. Acad. Sc., III (1893), p. 27.

Hypochlora alba BRUNNER, Rév. Syst. Orth. (1893), p. 145.

Pale yellowish green with very feeble markings. Head pale yellowish green, often more or less grayish and punctate or irrorate with pale ferruginous, and sometimes with a feeble inconspicuous pallid stripe from the upper margin of the eye backward; antennae pale luteous at base becoming ferruginous and at tip sometimes infuscated. Pronotum pale yellowish green, sometimes grayish, rarely brighter green, not infrequently sprinkled with ferruginous dots, the position of the lateral carinae in best-marked specimens marked with an inconspicuous pale yellow stripe, sometimes very inconspicuous, deepening in color

from above downward; the lower half of the lateral lobes rather lighter colored than the disk of the pronotum. Tegmina pale grass green. Fore and middle legs greenish yellow; hind femora pale yellowish green, sometimes a little infuscated especially above, occasionally sprinkled sparsely with ferruginous dots; hind tibiae very pale faintly bluish green, the spines with only their extreme tips brownish or blackish. Supraanal plate of male pretty regularly triangular with subacuminate apex, the surface tectate and the mesial ridge divided in two by a narrow percurrent sulcus, deep on the basal half of the plate; furcula composed of a pair of adjacent, straight and very slender, cylindrical, bluntly acuminate processes, several times longer than broad; cerci very delicate, tapering on the basal half, beyond very slender, equal, compressed, cylindrical, apically bluntly subacuminate, the apical half considerably and gradually incurved; infracercal plates narrow, laterally arcuate, a little shorter than the supraanal plate, concealed by the recumbent cerci.

Length of body, male, 14.5 mm., female, 21.5 mm.; antennae, male, 7 mm., female, 6.5 mm.; tegmina, male, 4.5 mm., female, 5.4 mm.; hind femora, male, 9.5 mm., female, 12 mm.

Thirteen males, 23 females. Bismarek, Burleigh County, North Dakota, August 9 (L. Bruner); Fort Robinson, Dawes County, Nebraska, August 21-22, L. Bruner (U.S.N.M.—Riley collection); Nebraska, G. M. Dodge (S. H. Scudder; S. Henshaw; U.S.N.M. [No. 706]—Riley collection); Gordon, Sheridan County, Nebraska, L. Bruner (U.S.N.M.—Riley collection); Valentine, Cherry County, Nebraska, L. Bruner (the same); Finney County, Kansas, September, H. W. Menke (University of Kansas); between Smoky Hill, Kansas, and Denver, Colorado, L. Agassiz (Mus. Comp. Zool.); Colorado, 5500 feet, Morrison; Pueblo, Colorado, 4700 feet, August 3^d-31.

The species was originally described from Glencoe, Dodge County, Nebraska. It has since been reported from Manitoba, Minnesota, Dakota, Montana, and from Fort McKinney, Johnson County, Wyoming, and Kansas by Bruner, from Iowa by Osborn, and Colorado by Thomas. "Here in Nebraska," says Bruner, "it is one of our commonest species, when one knows where to look for it." It feeds, according to the same writer, on what is called in the West "white sage," *Artemisia ludoviciana*, with which its colors closely correspond.

15. CAMPYLACANTHA, new genus.

(καμπύλος, bent (backward); ἀκανθα, (prosternal) spine.)

Hypochlora BRUNNER (pars), Rév. Syst. Orth. (1893), p. 145.

Body somewhat compressed, rather densely pilose. Head rather prominent, especially in the male, the genae being rather tumid and the summit strongly arched and distinctly elevated above the level of the pronotum, the fastigium descending rapidly, but the face moder-

ately retreating; interspace between the eyes rather broad (male) or broad (female), the fastigium feebly if at all sulcate, the frontal costa distinctly broadest between the antennae, where it is nearly as wide as (male) or still much narrower than (female) the interspace between the eyes, pereurrent, sulcate at least below the ocellus; eyes not very prominent nor very large, longer in proportion to breadth in the female than in the male, and yet in the female hardly, in the male distinctly, longer than the anterior infraocular portion of the genae; antennae rather coarse, more than half as long as the body in the male, distinctly longer than head and pronotum together in the female. Pronotum subequal (male) or distinctly and very gradually broadening posteriorly (female), with a rather slight median carina, sometimes interrupted between the sulci, the disk very broadly subtectate, passing by a rounded angle, without forming lateral carinae, into the vertical (female) or subvertical (male) lateral lobes, the front margin subtruncate, in no way flaring, the hind margin obtusely angulate, the impunctate or very feebly rugulose prozona nearly or quite half as long again as the punctate or distinctly rugulose metazona, its transverse sulci moderately distinct, that in the middle straight, and followed a third of the way to the metazona by a similar but arcuate sulcus. Prosternal spine blunt conico-cylindrical, more or less retrorse; interspace between mesosternal lobes nearly twice as long (male) or half as long again (female) as broad, the inner margins of the lobes nearly straight; metasternal lobes attingent (male) or subattingent (female). Tegmina abbreviated, generally but not always a little longer than the pronotum, rounded or subacuminate at tip, their inner margins overlapping or separated. Fore and middle femora distinctly gibbous in the male; hind femora variable, as also the coloring of the inferior genicular lobe; hind tibiae with nine to ten, generally nine, spines in the outer series. Abdomen of male very feebly clavate, very feebly upturned, the lateral margins of the subgenital plate not ampliate at the base, the apex bluntly angulate at tip, with a distinct but not very large tubercle, extending beyond the inner side of the apical margin; furcula consisting of a pair of slight, rounded, feebly projecting lobes.

This genus is closely allied to *Hypochlora*, but is composed of generally stouter forms, in which the antennae are longer, the pronotum is usually rugulose rather than punctate, and the males of which have more tumid anterior femora, besides the differences pointed out in our table of genera.

C. acutipennis may be taken as the type.

The genus occurs only in the West, where it ranges east of the Rocky Mountains from Nebraska to Texas, and occurs again in Durango, Mexico.

ANALYTICAL KEY TO THE SPECIES OF CAMPYLACANTHA.

- A¹. Distal half of anal cerci of male less than half as broad as the extreme base.
- b¹. Hind femora relatively slender, the greatest breadth in the male being no greater than the length of the prozona.
- c¹. General colors griseous, with a slight greenish tinge; hind tibiae livid, finely flecked with griseous 1. *acutipennis* (p. 50).
- c². General colors olivaceous; hind tibiae yellowish green.... 2. *olivacea* (p. 51).
- b². Hind femora relatively stout, the greatest breadth in the male being a little greater than the length of the prozona; hind tibiae bluish green, lutescent apically 3. *similis* (p. 52).
- A². Distal half of anal cerci of male more than half as broad as the extreme base.
4. *cicax* (p. 52).

I. CAMPYLACANTHA ACUTIPENNIS.

(Plate IV, fig. 3.)

Pezotettix acutipennis SCUDDER!, Proc. Bost. Soc. Nat. Hist., XVII (1875), p. 472; Ent. Notes, IV (1875), p. 71; Cent. Orth. (1879), p. 16.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 58; Bull. Washb. Coll., I (1885), p. 136.
Hypochlora acutipennis BRUNNER, Rév. Syst. Orth. (1893), p. 145.

Brownish fuscous with a dull olivaceous tinge, giving a griseous aspect; excepting the abdomen pilose throughout. Head mottled irregularly with darker and lighter shades, a dark triangular spot in the middle of the posterior part of the summit, and generally an obscure dark band passing backward from the hinder edge of the eyes and crossing a portion of the sides of the pronotum; antennae pale yellowish, infuscated at extreme tip. Pronotum delicately rugulose, the median carina distinct, the dorsum more distinctly tectate in the female than in the male. Tegmina less than half as long as the body, but longer than the pronotum, tapering to a blunt point, dark brown, the veins and cross veins generally paler and olivaceous. Legs dusky, the middle femora blackish externally; hind femora more or less indistinctly trifasciate with blackish; hind tibiae livid, mottled minutely and profusely with brown, the apical half of the spines black. Supraanal plate of male triangular with nearly straight sides, acutangulate at tip, the apex blunt, the basal half with a deep sulcus between slightly converging elevated ridges, the apical half more or less depressed, but showing faint signs of the continuation of the median sulcus; furcula consisting of a pair of slight, rounded, adjacent lobes, projecting very slightly; cerci straight, slender, and short, scarcely reaching the tip of the supraanal plate, nearly straight on the inferior margin, above narrowing rapidly in basal, gradually in apical, half, again more rapidly at extreme tip, the apex bluntly acuminate; infracercal plates broad at base, regularly tapering, with nearly straight outer margin, failing to attain the tip of the supraanal plate, visible outside the recumbent cerci.

Length of body, male, 20.5 mm., female, 24.5 mm.; antennae, male, female, 10.5 mm.; tegmina, male, female, 8 mm.; hind femora, male, 13 mm., female, 15 mm.

Eight males, 4 females. Texas, Belfrage (U.S.N.M.—Riley collection); Texas, Lincecum; Dallas, Texas, J. Boll; Bosque County, Texas, G. W. Belfrage; Fort Worth, Tarrant County, Texas, May (U.S.N.M.—Riley collection); San Antonio, Bexar County, Texas (L. Bruner). It is also reported from McPherson, Labette, Shawnee, and Barber counties, Kansas, by Bruner. Boll took the species in September and October in woods, on plants and bushes; Belfrage in October on prairies.

2. CAMPYLACANTHA OLIVACEA.

(Plate IV, fig. 4.)

Pezotettix olivaceus SCUDDER!, Proc. Bost. Soc. Nat. Hist., XVII (1875), p. 472; Ent. Notes, IV (1875), p. 71; Cent. Orth. (1879), p. 16.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 58; Ins. Life, III (1891), p. 229; Bull. Div. Ent., U. S. Dep. Agric., XXIII (1891), p. 14; Publ. Nebr. Acad. Sc., III (1893), p. 27.

Bright olivaceous green, occasionally somewhat infuscated and so approaching in appearance *C. acutipennis*. Summit of head with a dark-green median stripe, broadening posteriorly, sometimes including a median yellowish thread; sides of head and sometimes the front tinged with yellow; antennae green at base, beyond orange, infuscated at the extreme tip. Pronotum covered rather profusely with short longitudinal dashes of lemon yellow, rather irregularly distributed but distinctly marking the median carina, excepting at its posterior extremity, and also the two extremities, rarely the whole, of the lateral carinae. Tegmina green, generally half the length of the abdomen, occasionally but little longer than the pronotum, rarely half as long again. Legs stout, yellowish green, the fore and middle femora more or less tinged with dull orange; outside of hind femora slightly infuscated, the tibial spines black-tipped. Supraanal plate of male and furcula wholly similar to the same parts in *C. acutipennis*; cerci straight and slender, shorter than the supraanal plate, usually partially erect, at least in cabinet specimens, the basal half tapering, the apical less than half as broad, equal, the tip rounded but a little produced below, the outer surface slightly sulcate on the apical half; infracercal plates as in *C. acutipennis*.

Length of body, male, 21 mm., female, 29 mm.; antennae, male and female, 10.5 mm.; tegmina, male, 8.5 mm., female, 13.5 mm.; hind femora, male, 13.5 mm., female, 17.5 mm.

Twenty males, 20 females. Lincoln, Nebraska (L. Bruner); Douglas County, Kansas, 900 feet, September (University of Kansas); Texas, September 14, Belfrage; Bosque County, Texas, October 24-27, Belfrage; Dallas, Texas, September 9, J. Boll; Fort Worth, Tarrant County, Texas, May (U.S.N.M.—Riley collection). Frequently found sitting on fences in the autumn, according to Belfrage.

This species very closely resembles the preceding, and may perhaps yet be proved but a dimorphic form of the same; it appears to be commoner and to have a wider range. Bruner states that he has seen it

"in beet fields several times under such circumstances as led [him] to think it feeds upon that plant. It is also quite partial to *Helianthus* and *Chenopodium*."

3. *CAMPYLACANTHA SIMILIS*, new species.

(Plate IV, fig. 5.)

Dark bluish green, more or less infuscated and enlivened by various shades of green. A broad, longitudinal, sordid yellow stripe behind the upper half of the eyes, beginning at their nearest approximation, leaves on the top of the head a broad, equal, dark bluish green dorsal stripe: the genae are more or less mottled with olivaceous and the antennae are ferruginous, deeply infuscated. Pronotum more or less deeply tinged with dark olivaceous, the upper half of the lateral lobes of the prozona alone pure bluish green, though the dorsum of the metazona approaches it. Tegmina dull green, infuscated basally, nearly or quite half as long as the abdomen, subacuminate. Fore and middle femora dull ferruginous, apically dark olivaceous; hind femora stouter than in the two preceding species, bluish green on the outer face, slightly infuscated at the incisures, greenish fuscous above feebly bifasciate with fuscous, flavo-luteous below and within, and with a feeble and broken testaceous pregenicular annulus; hind tibiae pale bluish green, deepest at base, followed by a dull luteous annulus and becoming lutescent apically, the spines tipped with black. Supraanal plate of male similar to that of the two preceding species, but flatter, with lower ridges; furcula as there; cerci almost as long as the supraanal plate, tapering very rapidly in the basal third, beyond slender, less than half as broad as the base, subequal, expanding feebly beyond the middle and then tapering again, the lower portion of the tip very slightly produced and very feebly curved downward; infracercal plates much as in the preceding species or perhaps broader basally.

Length of body, male, 23.5 mm., female, 35 mm.; antennae, male, female, 10.5 mm.; tegmina, male, 9 mm., female, 11.5 mm.; hind femora, male, 13.5 mm., female, 17.5 mm.

One male, 1 female. Lerdo, Durango, Mexico, November (L. Bruner).

This species, though closely allied to the preceding, is distinguishable from it not only by its colors, but by the greater stoutness of the hind femora, more easily recognized than described.

4. *CAMPYLACANTHA VIVAX*.

(Plate IV, fig. 6.)

Pezotettix vivax SCUDDER!, Ann. Rep. Geol. Surv. W. 100th mer. 1876 (1876), p. 284; Ann. Rep. Chief Eng. 1876 (1876), p. 504.—BRUNER, Rep. U. S. Ent. Comm. III (1883), p. 59.

Head large, prominent, yellowish green, mottled with brown, which on the summit forms a very broad longitudinal stripe; vertex between the eyes as broad as the frontal costa, the fastigium slightly sulcate;

frontal costa equal, rather deeply sulcate below the ocellus; antennae light brown, the basal joint unusually small. Pronotum small, equal, compressed, the dorsum flat, the whole so much smaller than the head as to give the insect a strangulated appearance, brownish green, mottled with darker and lighter markings, the lateral carinae with a yellowish stripe and the lateral lobes with a similar oblique stripe descending to the lower anterior angle; the metazona is profusely punctate, the transverse sulci deeply impressed, the median carinae obsolescent, the lateral carinae wholly obtuse, the posterior margin very obtusely angulate. Prosternal spine not very stout, cylindrical, very bluntly tipped, inclined rather strongly backward. Tegmina about as long as the pronotum, slender, short, lanceolate; wings rudimentary. Hind femora slender, yellow, tinged on the upper half with brownish, and obscurely, narrowly and transversely bifasciate above with the same; hind tibiae glaucous (?), the spines reddish, tipped with black; arolium extremely large. Abdomen yellowish, tinged above with greenish brown, the last segment of the male scarcely upturned. Supraanal plate of male broad triangular, with a deep percurrent median sulcus, the margins of which are strongly elevated in the basal half, gently elevated in the apical half, the apex slightly less than rectangular, blunt; furcula consisting of a pair of minute, rounded, slightly projecting, adjacent lobes; cerci compressed laminate, scarcely reaching the tip of the supraanal plate, gently incurved, tapering on the basal half, scarcely enlarging beyond, where it is more than half as broad as at the base, the tip broadly rounded, but slightly produced below.

Length of body, male, 18.5 mm.; antennae, 9.5 mm.; tegmina, 4.15 mm.; hind femora, 9 mm.

One male. Plains of northern New Mexico, eastern slope, October 14-31, Lieutenant W. L. Carpenter.

16. EOTETTIX, new genus.

(ἠώς, dawn, i. e. eastern; τέττιξ, grasshopper.)

Body slender, elongate, feebly compressed, with very sparse pilosity. Head relatively large and rather prominent but short, apart from the prominent eyes almost broader than the pronotum, the face not very oblique, the genae not tumescent, all the carinae prominent; vertex faintly arched, not raised above the pronotum; fastigium rather narrow but greatly broadening anteriorly, very little declivent, shallowly sulcate; frontal costa about as broad as the interspace between the eyes, broadening above, the margins distinctly elevated throughout; eyes large and very prominent, rather broad oval, about half as long again as broad, separated above by a moderate interval; antennae slender, slightly depressed. Pronotum moderately long, equal, compressed, with rounded subteclate but otherwise plane disk, the median

carina sharp, equal and percurrent, the lateral carinae distinct but confined to the anterior lobe of the prozona, and somewhat approximated, the two sections of the prozona independently and rather abruptly tumid on the upper part of the lateral lobes, the transverse sulci of the prozona obscure but straight, the front margin truncate, the hind margin produced but obtusangulate. Prosternal spine sharply acuminate; meso- and metastethia together much longer than broad; the mesosternal lobes approximate in the male, the metasternal attingent. Tegmina abbreviate, broad lanceolate, acuminate, attingent. Hind femora not very long, the lower genicular lobe pallid except for a narrow, basal, transverse, fuscous streak; hind tibiae with 12 spines in the outer series. Abdomen of male compressed, the subgenital plate equal, its middle with a pronounced, backward directed, apical tubercle, the lateral margins basally ampliate; furcula distinctly developed; cerci styliform, straight, acuminate.

A single species is known, from Florida.

EOTETTIX SIGNATUS, new species.

(Plate IV, fig. 7.)

Pezotettix signata McNEILL!, MS.

Of medium size, glistening flavo-testaceous. Head prominent, light fusco-olivaceous, above broadly infuscated along the middle line and with a narrow piceous postocular stripe, bordered by flavous; vertex feebly tumid, not rising above the level of the pronotum, the interspace between the eyes fully half as broad again as the first antennal joint; fastigium almost twice as broad anteriorly as posteriorly, little declivent, broadly and shallowly sulcate; frontal costa distinctly percurrent, equal below the ocellus, distinctly broader above it, so as to be as broad there as the interspace between the eyes, the lateral borders elevated throughout but rounded and not acute, densely punctate throughout; lateral carinae of face prominent; eyes large, very prominent, nearly half as long again as the infraocular portion of the genae; antennae luteous. Pronotum equal, in no way flaring on the metazona, the lateral lobes with a not very broad, percurrent, glistening, blackish fuscous, postocular stripe, directly beneath which the lateral lobes are more brightly colored than below; disk broadly convex, passing into the vertical lateral lobes almost insensibly, except on the anterior section of the prozona, where there are distinct lateral carinae, which are separated from each other by only about three-fourths the entire width of the prozona; median carina sharp, percurrent, equal, but on the metazona diminishing posteriorly; front margin truncate, hind margin bluntly obtusangulate; prozona distinctly longitudinal, sparsely punctate, nearly half as long again as the rather closely and finely punctate metazona. Prosternal spine small and rather short, acutely conical; interspace between mesosternal lobes very narrow, much more than

twice as long as broad; metasternal lobes broadly attingent. Tegmina scarcely longer than the pronotum, broad lanceolate, acuminate, with strongly convex costal margin, pale testaceous. Fore and middle femora very tumid in the male; hind femora uniform flavo-testaceous, with no markings except a feeble and narrow, transverse, fuscous stripe at the base of the geniculation, and a fuscous upper edging to the genicular arc; hind tibiae very pale red or pink, the spines pallid on the basal, black on the apical half, 12 in number in the outer series. Extremity of male abdomen feebly clavate, scarcely recurved, the supraanal plate triangular, tectate, rising to a pair of high but rounded converging ridges, inclosing between them the deep triangular sulcus, which crosses the basal half of the plate; furcula consisting of a pair of stout and coarse, subparallel, rather distant, subequal, blunt projections, a little longer than broad and than the last dorsal segment; cerci slender, delicate, conical, straight, finely acuminate, about as long as the supraanal plate; subgenital plate rather small, considerably longer than broad, equal, terminating in a backward-directed, bluntly rounded tubercle, seated on the middle of the apical portion of the plate, the apical and lateral margins in the same plane, the former well rounded, entire.

Length of body, male, 19 mm.; tegmina, 6.25 mm.; hind femora, 11.5 mm.

One male. East Florida, William H. Ashmead (J. McNeill).

17. HESPEROTETTIX.

(ἑσπερος, western; τέττιξ, grasshopper.)

Hesperotettix SCUDDER, Bull. U. S. Geol. Surv. Terr., II (1875), p. 262.

Body almost parallel-sided, very little enlarged at the metathorax, more or less but not greatly compressed, more so in the male than in the female. Head not very prominent; vertex usually very narrow between the eyes, with a slight depression or sulcation between; fastigium broadening in front of it, declivent, with a median depression or longitudinal sulcation, sometimes distinct, sometimes obscure, the sides rounded; front straight, somewhat oblique, the frontal costa equal, only slightly contracted at the extreme summit, generally as broad as if not broader than the interval between the eyes, sulcate throughout; antennae slightly (female) or considerably (male) longer than the head and pronotum together; eyes slightly prominent, a little more so in the male than in the female, rather long oval, much longer than the infraocular portion of the genae. Pronotum long and slender, the dorsum fully half as long again as broad, the prozona the longer, sometimes half as long again as the metazona, with less distinction in surface and sculpture between them than common, alike broadly tectiform, the median carina slight but alike or nearly alike in both, the descending lateral lobes separated by no angle or ruga; posterior margin very obtusely angulate, the angle rounded, the border delicately margined. Prosternal spine rather long, bluntly conical; meso- and

metastethia together much longer than broad; interspace between mesosternal lobes generally twice as long as broad in the male, almost equally narrow or subquadrate in the female, the metasternal lobes subattinent in both sexes. Tegmina and wings always present, generally fully developed or a little abbreviate, but sometimes lobate. Fore and middle femora of male tumid; hind femora long and slender, somewhat compressed, generally surpassing the abdomen, the superior carina slight, unarmed; hind tibiae feebly ampliate apically, with spines of similar length on the two sides; first joint of hind tarsi scarcely longer than the third, the second small, with a large inferior apical lobe; arolium rather large, nearly twice as long as broad. Subgenital plate of male furnished with a prominent, subapical, more or less conical tubercle, the lateral margins of the plate suddenly ampliate at base; furcula always distinctly present as a pair of projecting lobes; last abdominal segment of female not abbreviate, the ovipositor normally exerted.

The type is *H. festivus* Scudder, a species mistaken for *H. viridis* Thomas at the time the genus was described.

This genus is closely related to *Hypochlora* and *Campylacantha*, but is separated from them by the basal ampliation of the margins of the subgenital plate of the male. One of the species indeed (the most aberrant one) was originally placed by Brunner in *Hypochlora*. The genus is still more closely allied to *Aeoloplus*, from which it is separable by the form of the pronotum and the slenderness of the body.

It is found across the United States, but only a single species is known east of the Great Plains, and that one has only been found on or near the Atlantic border. It is generally characteristic of the West.

Many of the species are very closely allied and have hitherto been confounded by all observers. A large amount of material now enables me to distinguish them and to find characters which will rarely fail of tolerably certain separation.

ANALYTICAL KEY TO THE SPECIES OF HESPEROTETTIX.

A¹. Metazona of pronotum distinctly punctate on dorsum; prozona smooth, except sometimes feebly punctate on dorsum; nowhere rugulose.

b¹. Pronotum highly and irregularly diversified in color, or else nearly devoid of markings of any kind, the dorsum nearly plane; tegmina in the diversified species marked with a white or pallid stripe on the division line between the discoidal and anal areas.

c¹. Transverse sulci of the pronotum distinctly marked in black; hind femora with a distinct pregenicular annulation.

d¹. Relatively slender-bodied, with slender femora; tegmina rarely as short as the body and then only in male; antennae of male slender, distinctly longer than the head and pronotum together 1. *viridis* (p. 57).

d². Relatively stout-bodied, with stout femora; tegmina surpassing the body only in the male and then but slightly; antennae of male coarse, scarcely longer than the head and pronotum together 2. *meridionalis* (p. 59).

c². Transverse sulci of pronotum not marked in strong colored contrast to surroundings; hind femora without red pregenicular annulation or only faint signs of one 3. *festivus* (p. 60).

*b*². Pronotum diversified in color only by longitudinal stripes, the dorsum distinctly tectiform; tegmina without pale stripes (though they are occasionally indicated).

*c*². Tegmina lobiform, no longer than the pronotum.

*d*¹. General color dark brown, occasionally with a tinge of green; tegmina short ovate, distinctly shorter than the pronotum 4. *pacificus* (p. 61).

*d*². General color grass-green; tegmina long oval, scarcely shorter than the pronotum 5. *curtipennis* (p. 62).

*e*². Tegmina fully developed or abbreviate, fully twice or nearly twice as long as the pronotum.

*d*³. Tegmina and wings abbreviate, much shorter than the body.

6. *brevipennis* (p. 63).

*d*³. Tegmina and wings distinctly surpassing the abdomen, or sometimes in the female only equaling it 7. *pratensis* (p. 64).

*A*². Pronotum tectiform; both prozona and metazona, both on dorsum and lateral lobes, equally and distinctly rugulose 8. *speciosus* (p. 66).

I. HESPEROTETTIX VIRIDIS.

(Plate IV, fig. 8.)

Caloptenus viridis THOMAS, Ann. Rep. U. S. Geol. Surv. Terr., V (1872), p. 450, pl. II, fig. 3.—GLOVER, Ill. N. A. Ent., Orth. (1872), pl. II, fig. 3.

Ommatolampis viridis THOMAS (pars), Rep. U. S. Geol. Surv. Terr., V (1873), p. 156;? Rep. Geol. Geogr. Surv. 100th mer., V (1875), p. 892.—BRUNER, Can. Ent., IX (1877), p. 144.

Hesperotettix viridis UHLER (pars), Bull. U. S. Geol. Surv. Terr., III (1877), p. 795.—? THOMAS, Ann. Rep. Chief Eng., 1878 (1878), p. 1845.—BRUNER (pars), Rep. U. S. Ent. Comm., III (1883), p. 59; Bull. Washb. Coll., I (1885), p. 137.—? COQUILLET, Rep. U. S. Ent., 1885 (1886), pp. 295, 297.—BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 26.

Pezotettix viridis STÅL, Bih. K. Sv. Vet.-Akad. Handl., V, No. 9 (1878), p. 14.

Hesperotettix montanus BRUNER¹, MS.

Head varying from olivaceous to ochraceous, sparsely and rather coarsely punctate with fuscous, the costae, front, and inferior margins of the genae more or less pallid, an infraocular black bar and infra-antennal black band, the clypeal incisures black; fastigium more or less infuscated or blackish, and the vertex with a longitudinal black stripe, broadening posteriorly and there sometimes inclosing a pallid thread; sides of the head behind the eye more or less streaked longitudinally with blackish; antennae warm testaceous, with a greenish tinge near base. Pronotum of the same ground color as the head, but the dorsum often with more or less of a testaceous or subferruginous tint, the sulci narrowly marked in black, a moderately broad mediodorsal bright or dull white stripe rather narrowly margined, sometimes with the exception of the metazona, with black or fuscous; lateral lobes much variegated on the prozona by an irregular assortment of brief, longitudinal, black, rarely dark-green bars, sometimes more or less connected to form a gently oblique moderately broad belt. Pleura and tegmina as in *H. festivus*, and the femora similar, but the hind femora almost always furnished with a moderately broad pregenicular salmon colored complete annulation; hind tibiae and tarsi as in *H. festivus*. Supraanal

plate of male triangular with roundly acute apex, about as long as broad, the margins straight and upturned, leaving between them and the basal U-shaped elevated ridge a broad deep sulcus, on which is further impressed a slight median longitudinal sulcus from the extremity of the basal ridge; furcula consisting of a pair of slight subtriangular projections overlying the two bases of the basal ridge; cerci simple, subconical, scarcely so long as the supraanal plate, tapering but little and that wholly in the basal half, the apex rather blunt, rounded, gently incurved; infracercal plates inconspicuous, shorter than the supraanal plate.

Length of body, male, 17 mm., female, 20 mm.; antennae, male, 7.4 mm., female, 8 mm.; tegmina, male, 13.3 mm., female, 19.2 mm.; hind femora, male, 9.75 mm., female, 14.75 mm.

Twenty-four males, 40 females. Sidney, Cheyenne County, Nebraska, August. L. Bruner; Lakin, Kearny County, Kansas, 3,000 feet, September 1; Colorado, 5,500 feet, Morrison (S. Henshaw; U.S.N.M.—Riley collection); Custer County, Colorado, Cockerell (U.S.N.M.); Plains of southern Colorado, July 25, F. H. Snow (University of Kansas); Chaves, New Mexico, September 6; Dallas, Texas, Boll; San Antonio, Bexar County, Texas (U.S.N.M.—Riley collection); Carrizo Springs, Dimmit County, Texas, A. Wadgymar, June (L. Bruner); Fort Grant, Graham County, Arizona (U.S.N.M.—Riley collection); Tighes, San Diego County, California, Palmer; Siskiyou County, California (U.S.N.M.); Montagne, Siskiyou County, California (L. Bruner).

The species was originally described from Colorado, Wyoming, and Kansas, and has since been reported from [New Jersey] (Uhler), [Minnesota] and Iowa (Bruner), Nebraska (Thomas, Bruner), Kansas and Colorado (Bruner), Beaver Brook and the Grand Canyon of the Arkansas (Uhler); Texas [and Mexico] (Uhler); [Utah] (Bruner), and San Joaquin Valley, California (Coquillet). Localities which are in doubt or in error are placed in brackets.

This species closely resembles *H. festivus*, but while generally of a little larger size is distinguished from it by the black-marked sulci of the pronotum, the generally but not invariably greater irregularity of the markings of the lateral lobes of the pronotum, the red annulation of the hind femora (though this will probably be found in some individuals of *H. festivus*) and the ground color of the head and pronotum, as well as in slight differences in the abdominal appendages of the male. The eyes are slightly more elongate in *H. festivus* than in the present species, at least in the female.

It is wholly uncertain to what species belongs the reference by Thomas¹ to an insect with tegmina only one-third the length of the abdomen, taken in northern New Mexico or Colorado. I have placed it here with a query.

I possess a couple of females, collected by R. Ridgway in Ruby

¹ Ann. Rep. Chief Eng., 1878, 1845.

Valley, Nevada, but preserved after long immersion in spirits, which, until fresh specimens are obtained for study, I regard as belonging to this species. They are, however, remarkable for the brevity of the tegmina, which are only as long as the pronotum, and the species has not been otherwise recorded from this region. They seem to represent a short-winged form of this species, their tegmina overlapping like the normal form and not lobate, as in the strictly brachypterous species of this genus.

2. HESPEROTETTIX MERIDIONALIS, new species.

(Plate IV, fig. 9.)

This species differs but little from *H. festivus*, but has even more strikingly contrasted colors, the green of which is deeper and of a bluer tint and the femora are stouter. The face is yellow with a slight greenish tint, coarsely and distinctly punctate with blackish brown; the intercostal interspace below the antennae is heavily infuscated and the usual short bar below the eyes is present; vertex yellow, the fastigium heavily infuscated and behind it a widening blackish stripe, posteriorly inclosing a median yellow thread; antennae fuscous, the joints feebly and narrowly annulate with pale ferruginous. Pronotum yellow, more or less olivaceous, and on the metazona often heavily suffused with bright ferruginous, all the transverse sulci and particularly that close to the front margin heavily marked in black, which cuts the heavy black-bordered mediadorsal yellow stripe; upper portion of the lateral lobes more or less heavily marked with black on the prozona; pleural sutures heavily marked in black. Tegmina of about the length of the abdomen, bluish green, the discoidal and posterior ulnar veins with a narrow pallid yellow stripe. Fore and middle femora dull ferruginous; hind femora with the outer face dull greenish luteous, the superior carina heavily flecked and punctate with fuscous, and a faint, broad, dull coral red, pregenicular annulation; hind tibiae greenish blue, the spines white with black tips, the tarsi more or less testaceous. Supraanal plate of male much as in *H. festivus*, the furcula consisting of a pair of minute but boldly projecting rounded lobes, separated by twice their own width; cerci slightly compressed, subconical, tapering much more rapidly in the proximal than in the distal half, the latter being nearly equal, the tip rounded but slightly produced and gently incurved, the whole scarcely so long as the supraanal plate; infracercal plates inconspicuous, apically tapering, almost as long as the supraanal plate.

Length of body, male, 21 mm., female, 26 mm.; antennae, male, 8 mm., female, 7.75 mm.; tegmina, male, 15.5 mm., female, 20 mm.; hind femora, male, 12 mm., female, 15.7 mm.

One male, 2 females. Guanajuato, Mexico, A. Duges (U S.N.M. [No. 707]); Sierra Nola, Tamaulipas, Mexico, December 2-6, E. Palmer.

There is also a male from Mexico in the Museum of Comparative

Zoology which may belong here (as the cerci indicate), but the tegmina are longer than in the specimens described above and the whole appearance and the proportions are those of *H. festivus*.

Besides the colorational features which distinguish this species from *H. viridis*, the body is relatively stouter, the antennae coarser and shorter in proportion to the pronotum, the latter is more acutely angulate behind (though the difference is but slight), the hind femora are shorter and stouter, and the tegmina and wings relatively shorter.

3. HESPEROTETTIX FESTIVUS, new species.

(Plate IV, fig. 10.)

Hesperotettix viridis SCUDDER!, Bull. U. S. Geol. Surv. Terr., II (1876), p. 262.—THOMAS, Proc. Dav. Acad. Sc., I (1876), p. 262.—SCUDDER!, Rep. U. S. Ent. Comm., II (1881), App., p. 24.—BRUNER (pars), *ibid.*, III (1883), p. 59.

Face varying from green-yellow to pallid yellow, more or less deeply infuscated in the intercostal space below the antennae, the frontal costa sulcate throughout excepting above, and faintly and distantly punctate with fuscous on the margins; genae pallid or greenish pallid except for a short, slender, oblique, blackish stripe below the eye. Summit of head and dorsum of pronotum buff, greenish buff, rarely green, or olivaceous, with a median, black-margined, white or pallid stripe, the stripe reduced to a thread on the head, the black edging remaining; on the sides, above the middle, is a more or less irregular black stripe, more interrupted or broken in the female than in the male, extending from behind the eyes, where it is reduced to parallel longitudinal streaks, to the hinder edge of the prozona, bordered broadly below and above with pallid, above forming a stripe which begins narrowly along the upper edge of the eyes and continues also across the metazona, occupying the position of lateral carinae; excepting for stripes at the median and lateral carinae, the metazona is uniformly buff or rarely green and is very shallowly punctate; both meso- and metapleura with an oblique, fusiform, pallid stripe, margined more broadly in some places than in others with black. Tegmina of about the length of the abdomen, rather dark bluish green, the anal area more or less deeply tinged with buff, the discoidal and posterior ulnar veins white, the veinlets impinging on the apical margin distinctly blackish. Fore and middle femora buff, inclining to ferruginous; hind femora buff, but purplish on the outer face and more or less infuscated, the geniculation with a blackish crescent on the outer and inner sides; hind tibiae bluish green, becoming more or less pallid or testaceous distally, the spines white with black tips, the tarsi testaceous or greenish testaceous. Supraanal plate of male triangular, of about equal length and breadth, broadly rounded apically, with straight and slightly upturned margins, the surface with a pair of converging stout elevated ridges, forming a basal triangular pit between them, and in the distal half of the plate beyond the united ridges a slight median sulcus; furcula consisting of a pair

of minute rounded lobes, separated by about their own width; cerci simple, subconical, tapering a very little, more rapidly in the proximal than in distal half, subacutely pointed, as long as the supraanal plate and feebly incurved; infracereal plates not very broad, as long as the supraanal plate, completely concealed by the recumbent cerci.

Length of body, male, 15.5 mm., female, 20.5 mm.; antennae, male, female, 7 mm.; tegmina, male, 12 mm., female, 13 mm.; hind femora, male, 9.1 mm., female, 11 mm.

Sixty-six males, 58 females. Salt Lake Valley, Utah, 4,300 feet, July 26, August 1-4 (S. H. Scudder; U.S.N.M. [No. 708]); American Fork Cañon, Utah, 9,500 feet, August 2-3; Provo, Utah, August 23-24; Spring Lake Villa, Utah County, Utah, August 1-4, E. Palmer; Los Angeles County, California, Coquillett (U.S.N.M. [No. 708].—Riley collection).

The species has previously been reported (under another name) from Lake Point, Salt Lake and Salt Lake Valley (Scudder), Mount Nebo and Spring Lake, Utah (Thomas), and Utah (Bruner).

The contrasts of colorings in this species render it a more variegated insect than any of the other species of the genus, particularly when the buff colors are deepest and bring out the black and white with greatest vividness.

4. HESPEROTETTIX PACIFICUS, new species.

(Plate V, fig. 1.)

Hesperotettix pacificus BRUNER!, MS.—KOEBELE!, Bull. Div. Ent. U. S. Dep. Agric., XXII (1890), p. 94.—undescribed.

Body feebly but not briefly pilose; general color dark brownish testaceous, frequently tinged more or less with olivaceous. Head sparsely punctate, with a variable broad black bar below the eyes, sometimes reduced to a V-shaped spot and in greener specimens dark olivaceous; a similar broad dark stripe behind the eyes, and the summit generally with a mediodorsal black stripe, sometimes having a median light thread through it; fastigium generally sulcate, sometimes reduced to a pit in front of the eyes; frontal costa equal, about as wide as the space between the eyes, more or less feebly sulcate; antennae testaceous, generally darker apically and sometimes pallid basally, about as long as (female) or much longer than (male) the head and pronotum together. Pronotum scarcely enlarged from in front backward, rounded tectiform, with the bluntest possible median carina, the prozona smooth or very feebly and sparsely punctate, the metazona about two-thirds as long as the prozona and punctate, the hind margin very obtusely angulate, the angle broadly rounded; there is a slender pallid or testaceous median stripe, more distinct on the prozona than on the metazona, on the former and occasionally on the latter margined, generally narrowly, with black; on the upper part of the lateral lobes of the prozona is a broad black band, often obscure and on greenish specimens sometimes obsolete, and where most pronounced bordered broadly below and nar-

rowly above with white. Tegmina uniform greenish fuscous, short ovate, less than twice as long as broad, shorter than, sometimes hardly more than half as long as, the pronotum. Hind femora dark testaceous with the outer face light testaceous, its distal third blackish and a premedian angulate blackish bar (on greenish specimens almost wholly green, enlivened on upper surface with a ruddy tint); hind tibiae fuscoglaucous or glaucous, the spines black tipped. Supraanal plate of male triangular, the sides feebly and angularly emarginate, the apex acute, with a basal median sulcus of similar shape not reaching the middle, the interspaces on either side very shallowly, broadly and roundly sulcate, and a slender tolerably deep median sulcus apically; furcula consisting of a pair of slightly projecting, subattinent, rounded lobes; cerci slender, tapering gently in basal half, beyond equal or very feebly expanded, the tip rounded but slightly produced, the apical half feebly incurved; apical tubercle of subgenital plate feeble, blunt, seen from behind broadly rounded.

Length of body, male, 18 mm., female, 22.5 mm.; antennae, male, 10 mm., female, 7 mm.; tegmina, male, 3.5 mm., female, 4 mm.; hind femora, male, 12 mm., female, 12.5 mm.

Two males, 8 females. Los Angeles, California, October 27, Coquillett (U.S.N.M. [No. 709].—Riley collection); Los Angeles, California, Koebele (L. Bruner); San Buenaventura, California (U.S.N.M. [No. 709].—Riley collection). Koebele reports it from the Shasta district in northern California.

The abdomen, which is carinate, sometimes has the carina distinctly lighter than the body.

This species most resembles *H. festivus* of the longer winged forms, but is very different from it.

5. HESPEROTETTIX CURTIPENNIS, new species.

Hesperotettix curtipennis BRUNER!, MS.

Body feebly and rather briefly pilose; general color green with an olivaceous tinge. Head with a yellow front margin to the genae, bordered posteriorly with a short dark greenish or bluish green bar below the eyes; behind the eyes is a broad dark green stripe (not so dark as the bar) margined with yellow, the inner margin passing along the upper edge of the eye; summit sometimes with a dark green median stripe; fastigium with a slight pit between the eyes and more or less sulcate on the expanded portion in front; frontal costa of somewhat irregular breadth, but about as wide as the interval between the eyes, distinctly sulcate; antennae testaceous, about as long as head and pronotum together in the female. Pronotum rounded tectiform, scarcely enlarging from in front backwards, the carina and carinal markings as in *H. pacificus*, the lateral lobes similarly marked, with a broad, yellow-bordered, blackish green bar crossing the prozona, its lower margin slightly oblique; hind margin broadly rounded, scarcely angulate, the

prozona plainly though feebly, sparsely and rather coarsely punctate, the metazona closely punctate. Tegmina rather long ovate, nearly twice as long as broad, and scarcely shorter than or at least three-quarters as long as the pronotum, green. Hind femora green, the outer half of the upper surface ruddy, the under surface and the carina beneath the outer field luteous; hind tibiae green, the spines pale green with black tips. Abdomen green, becoming darker above, the carina marked heavily with yellow and margined with blackish green.

Length of body, female, 23 mm.; antennae, 7.75 mm.; tegmina, 6 mm.; hind femora, 12.5 mm.

Two females. Colorado, Morrison (U.S.N.M. [No. 710]; L. Bruner).

Of the long-winged forms, this species most resembles *H. festivus*, but is easily distinguished from it, apart from the great difference in the tegmina.

6. HESPEROTETTIX BREVIPENNIS.

(Plate V, fig. 2.)

Ommatolampis brevipennis THOMAS!, Bull. U. S. Geol. Surv. Terr., I, No. 2 (1874), 1st Ser., p. 67.

Hesperotettix viridis UHLER (pars), Bull. U. S. Geol. Surv. Terr., III (1877), p. 795.—MORSE!, Psyche, VI (1892), p. 262; VII (1894), p. 106.

Head pea green, fusco-punctate in front, with a short blackish stripe below the eyes, behind the pallid callosity; streaks of dark green pass backward from the eye, and the vertex has a slender, mediodorsal fuscous stripe, narrowing anteriorly and ending at the base of the fastigium in a round blackish spot; antennae pale ferruginous, slightly infuscated apically. Pronotum shaped as in *H. pratensis*, pea green, with a moderately broad, bright ferruginous, obscurely fuscous, margined, mediodorsal stripe, generally broader in the female than in the male; and above the middle of the lateral lobes, but not reaching the front margin nor passing beyond the prozona, a blackish fuscous bar, sharply delimited below, fading out above, bordered beneath and sometimes interrupted posteriorly above with pallid; sides of the body green except that the metapleura have an oblique pallid stripe, bordered on the upper posterior and lower anterior sides with black. Tegmina considerably shorter than the abdomen in both sexes, but particularly in the female, the anal area and a little more than that ferruginous, its upper limit sometimes infuscated, the remainder pea green. Femora almost precisely as in *H. pratensis*; hind tibiae varying from pea green to pale bluish green, the spines pale on basal, black on apical half; hind tarsi concolorous with tibiae or sometimes a little yellower. Supraanal plate of male triangular, with straight sides and rounded subacute apex, about as long as broad, with a broad and rather high tectate ridge parallel to the margins, inclosing a deep, basally broad, triangular sulcus; furcula consisting of a pair of slightly projecting, moderate sized,

rounded lobes, separated by half their own diameter; cerci a little shorter than the supraanal plate, simple, conical, but slightly more rapidly tapering on basal than on apical half, bluntly acuminate; infracercal plates broad triangular, scarcely shorter than the supraanal plate, slightly ridged on its margins; last dorsal segment deeply emarginate, so as to be less than half as broad in the middle as at the sides.

Length of body, male, 16 mm., female, 24 mm.; antennae, male, 7.25 mm., female, 8 mm.; tegmina, male, 10.25 mm., female, 10 mm.; hind femora, male, 11 mm., female, 12.5 mm.

Ten males, 10 females. Wellesley, Norfolk County, Massachusetts, July 16–August 1 (A. P. Morse); New Jersey (U.S.N.M. [No. 711]); Georgia, Morrison.

This species has been previously recorded only from New Jersey (Thomas, Uhler), where Uhler says it is “not uncommon in the cranberry fields of Atlantic County;” and from Wellesley, Massachusetts, by Morse, who tells me that his specimens were taken in a very restricted locality, “a steep gravelly hillside, forming the terminal portion of a part of the gravel-plain formation of Wellesley,” where they were captured “by sweeping vigorously the short-tufted growth of bunch grass, *Anaropogon scoparius*, which with other wild grasses and running blackberry vines sparsely clothed the gravelly soil.” All his specimens were taken between mid July and mid August. Since writing me this, Mr. Morse has found another locality near the previous, where on July 10 he took both sexes mature and nymphs; the surroundings were similar.

This species is very closely allied to *H. pratensis*, but differs from it in its shorter tegmina and wings, the more regularly conical cerci of the male, the slightly different form of the supraanal plate and the markings; it is also of a smaller size.

7. *HESPEROTETRIX PRATENSIS*, new species.

(Plate V, fig. 3.)

Ommatolampis viridis THOMAS (pars), Rep. U. S. Geol. Surv. Terr., V (1873), p. 156.

Hesperoettia viridis UHLER (pars), Bull. U. S. Geol. Surv. Terr., III (1877), p.

795.—BRUNER (pars), Rep. U. S. Ent. Comm., III (1883), p. 59; Rep. U. S. Ent., 1885 (1886) p. 307.

Head yellowish green, sparsely punctate with fuscous in front, the lower portion of the face more or less obscured with purplish, a short fuscous stripe depending from the eye, in front of which the callosity is livid; vertex with a more or less distinct, rather narrow, fuscous or blackish stripe, narrowing anteriorly, and ordinarily with a median thread of yellow, the fastigium generally discolored, sometimes and especially in the female reddish. Pronotum scarcely (male) or slightly (female) increasing in breadth from in front backward, equally throughout and with no angle in the middle, yellowish green, occasionally, especially in Southern examples and apparently in the female only,

with a pallid line along the position of the lateral carinae of the prozona, extending also across the head where it follows the upper hinder margin of the eyes; above the middle of the lateral lobes, on the prozona, is a more or less distinct and irregular fuscous bar, generally darkest below, including on the hinder section a whitish dash in its upper part, and sometimes more or less margined with pallid, especially below; there is usually present, sometimes conspicuously, a narrower or broader mediodorsal stripe, sometimes pale yellow or pale yellow margined more or less broadly, and generally more broadly behind than in front, with reddish pink or fuscous, at other times, and especially in the female where it is at least generally broader, wholly reddish pink more or less infuscated. Tegmina of about the length of the abdomen in both sexes, green or yellowish green, the anal area and often a little more than that sometimes reddish pink, especially in the female. Legs green, the fore and middle femora more or less plainly annulate with coral red before the geniculation, and occasionally with a line of red above the upper margin of the outer face, the geniculation with a fuscous crescent both on the outer and inner side; hind tibiae pale bluish green, becoming more or less yellowish apically, the spines pallid on their basal, blackish brown on their apical half; hind tarsi pale green, more or less yellowish, especially at the apices of the joints. Supraanal plate of female triangular, subacutely but bluntly angulate, of about equal length and breadth, the margins nearly straight, the middle of either half with a rather broad moderately elevated ridge, the two converging beyond the middle of the plate and inclosing a deep basal sulcus; furcula consisting of a pair of minute rounded lobes, nearly twice as distant as their width; cerci considerably shorter than the supraanal plate, simple, regularly conical on basal half, the apical half subequal, bluntly pointed, very feebly downcurved; infracereal plates almost as long as the supraanal plate, inconspicuous; last dorsal segment broadly rounded and rather deeply emarginate.

Length of body, male, 18.5 mm., female, 30 mm.; antennae, male, 8.25 mm., female, 10.25 mm.; tegmina, male, 13 mm., female, 20 mm.; hind femora, male, 11.6 mm., female, 17.5 mm.

Forty males, 68 females. Red River of the North [Minnesota or Manitoba]. Uhler; southern Illinois, Kennicott; Crawford County, Iowa, July 13-24, J. A. Allen; Denison, Crawford County, Iowa, July 20, J. A. Allen; Jefferson, Greene County, Iowa, July 20-24, J. A. Allen; Dallas County, Iowa, August, J. A. Allen; Valentine, Cherry County, Nebraska, L. Bruner (U.S.N.M. [No. 712]); Fort Robinson, Dawes County, Nebraska, August 22, L. Bruner (U.S.N.M. [No. 712]); Chadron, Dawes County, Nebraska, L. Bruner (U.S.N.M. [No. 712]); Nebraska, Dodge, Hayden; West Point, Cuming County, Nebraska (L. Bruner); Bismarck, North Dakota, July 23, G. W. Sweet (U.S.N.M. [No. 712]); Wyoming, Morrison (U.S.N.M. [No. 712]); Fort McKinney, Johnson County, Wyoming, July 26 (U.S.N.M. [No. 712]); Fort Benton, Choteau County, Montana,

July 20 (U.S.N.M. [No. 712]); Brown's, Colville Valley, eastern Washington, July 24 (Museum Comparative Zoology); La Chapples, Yakima River, Washington, July 16 (Museum Comparative Zoology); Umatilla, Oregon, June 24 (Museum Comparative Zoology); Los Angeles, California, Coquillett (U.S.N.M. [No. 712]); San Diego, California, Blaisdell (L. Bruner); Tighes, San Diego County, California, E. Palmer; American Fork Canyon, Utah, 9,500 feet, August 23; Monument Park, El Paso County, Colorado, July 19 (U.S.N.M. [No. 712]); Manitou, El Paso County, Colorado, August 24-25; Beaver Brook, Jefferson County, Colorado, P. R. Uhler; Colorado, 8,000 feet, Morrison; latitude 38°, Lieutenant Beckwith; San Antonio, Bexar County, Texas, (U.S.N.M. [No. 712]); Dallas, Texas, July 18, Boll; Pecos River, Texas, Captain Pope; Orizaba, Mexico, January (L. Bruner). Nearly all the specimens from the National Museum are from the Riley collection.

Dr. J. A. Allen found the insect in Iowa only in dry prairies on the grass, excepting that the least-marked specimens occurred in groves and there only.

Occasionally a specimen, and especially a female, is found in which there is no trace of ferruginous on the tegmina, which are then green with a pallid stripe along the dividing line between the discoidal and anal areas, reminding one of *H. viridis* or *H. festivus*.

The specimen above referred to from Orizaba, a female, differs slightly in its somewhat abbreviated tegmina, and the mottled markings of pallid yellow and green upon the lateral lobes of the pronotum; it possibly indicates another species.

8. HESPEROTETTIX SPECIOSUS.

(Plate V, fig. 4.)

Pezotettix speciosus SCUDDER¹, Final Rep. U. S. Geol. Surv. Nebr. (1871), p. 250.—GLOVER, Ill. N. A. Ent., Orth., pl. XVII, fig. 4 (1874).—THOMAS, Bull. U. S. Geol. Surv. Terr., IV (1878), p. 484.—BRUNER, Can. Ent., IX (1877), p. 144.—STÅL, Bih. K. Sv. Vet.-Akad. Handl., V (1878), No. 9, p. 14.

Aceridium frontalis THOMAS, Ann. Rep. U. S. Geol. Surv. Terr., V (1872), p. 448, pl. II, fig. 1.—GLOVER, Ill. N. A. Ent., Orth. (1872), pl. XI, fig. 1.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 169.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 58; Bull. Washb. Coll., I (1885), p. 135; Bull. Div. Ent. U. S. Dep. Agric., XIII (1887), p. 11.—OSBORN, Ins. Life, IV, p. 64 (1891); Rep. Ent. Soc. Ont., XXII (1891), p. 70; Bull. Div. Ent. U. S. Dep. Agric., XXVII (1892), p. 59.—BRUNER, Ibid, XXVIII (1893), pp. 12-13, fig. 3; Publ. Nebr. Acad. Sc., III (1893), p. 26.

Hypochlora speciosa BRUNNER, Rev. Syst. Orth. (1893), p. 145.

Grass green. Head without markings, except that sometimes the lateral margins of the frontal costa, especially its upper portion, and the apex of the fastigium are tinged or flecked with roseate, also occasionally seen on the lateral carinae of the face; vertex more or less rugulose; eyes moderately distant, especially in the female, the frontal costa slightly narrower than the interspace between the eyes, equal sulcate, the tip of the fastigium also impressed; antennae pale pink.

pallid at base, slightly darker and sometimes infuscated at tip, nearly as long as (female) or much longer than (male) head and pronotum together. Pronotum tectiform with a feeble blunt and equal median carina, which is often but not always, sometimes conspicuously, pink roseate; prozona much longer than, in the male half as long again as, the metazona, rugulose, the raised portions generally more or less yellowish and having often a transverse, never a longitudinal trend; the metazona equally rugulose, but with a distinct longitudinal trend to the raised portions; hind margin obscurely and obtusely angulate. Tegmina green or yellowish green, the longitudinal veins being yellow and the ground green; they taper to a roundly acuminate tip and are of variable length in both sexes, but always considerably longer than the pronotum, in the male usually about two-thirds the length of the abdomen, in the female generally varying from two-thirds as long as to quite or nearly as long as the abdomen; wings pellucid green, with green veins. Hind femora green, the outer half of the upper surface below the carina often roseate, and the inner surface generally pale yellow; a faint sign of a pregenicular roseate annulation often appears; hind tibiae green, the spines pallid or yellowish green with black tips. Supraanal plate of male triangular, with slightly sinuate sides, the apex sometimes acute, sometimes rounded, with a rather broad and deep median sulcus in the basal half, bounded by a rather high and acute ridge on either side, between which and the margin is a rather deep and very broad valley; a slight median sulcus appears in the apical half; furcula consisting of a pair of approximate, little protruding, triangular lobes; cerci delicate and slender, tapering gently and more on basal than on apical half, though sometimes the apical half is nearly equal, bluntly acuminate at tip and with the outer half distinctly incurved; apical tubercle prominent, conical, more or less appressed; sometimes slightly transverse as viewed from behind, and occasionally (as in the figure; by accident in drying?) bifid.

Length of body, male, 22.5 mm., female, 34 mm.; antennae, male, 10 mm., female, 11.5 mm.; tegmina, male, 9 mm.,¹ female, 18.5 mm.; hind femora, male, 14 mm., female, 18.5 mm.

Twelve males, 27 females. Nebraska, Dodge, Scudder; Nebraska City and banks of Platte River, Nebraska, Hayden; Finney County, Kansas, September, H. W. Menke (University of Kansas); Lakin, Kearny County, Kansas, 3,000 feet, July 9, September 1; Garland, Costilla County, Colorado, 8,000 feet, August 28; Texas, Belfrage; Dallas, Texas, Boll; San Antonio, Bexar County, Texas (L. Bruner); Fort Worth, Tarrant County, Texas, May (U.S.N.M.—Riley collection); Gulf coast of Texas, Aaron; Pecos River, Texas, Captain Pope.

Since writing this, Mr. C. F. Baker has sent me specimens from Horsetooth Mountain, 6,000 feet, west of Fort Collins, Colorado.

The species has also been reported from Dakota or Montana (Thomas),

¹The male selected for measurement has unusually short tegmina.

Dakota, Wyoming, Iowa, Nebraska and Missouri (Bruner), Kansas (Thomas), Garden City, Kansas (Bruner, Osborn), Barber and Shawnee counties, Kansas (Bruner), Colorado or Northern New Mexico (Thomas), Colorado and New Mexico (Bruner), and Washington County, Texas (Bruner).

This species can hardly be confounded with any other, though it bears a close general resemblance to *Campylacantha acutipennis*, from which it is strongly separated by the prominence of the base of the lateral margin of the subgenital plate of the male. It is dimorphic in wing length.

18. AEOLOPLUS, new genus.

(αἰόλος, variegated; ὄπλον, armor.)

Body relatively short and stout, considerably enlarged at the metathorax, even in the male. Head normal, the eyes moderately distant, not very prominent except sometimes in the male, the summit well arched, the fastigium slightly sulcate between the eyes, the frontal costa moderately broad, subequal, plane or nearly plane; antennae moderately stout, cylindrical, equal, slightly longer (male) or slightly shorter (female) than the head and pronotum together. Pronotum stout, regularly increasing in size from in front backward, the disk gently convex transversely, the prozona slightly and independently tumid, with no or an exceedingly feeble median carina, distinguishing it from the flat carinulate metazona; posterior margin of pronotum very obtusely angulate, the angle more or less rounded; prozona about half as long again as the metazona, generally slightly broader than long or quadrate. Prosternal spine conical, erect; interval between mesosternal lobes of male about twice as long as broad, often clepsydral from the convexity of the inner margins of the lobes, of female varying from the same to quadrate, the metasternal lobes attingent or subattingent in the male, a little distant in the female. Fore and middle femora considerably tumid in the male, the hind femora relatively short and stout, occasionally furnished inferiorly in the male with a basal tooth protecting the calcaria when the tibiae are closed upon the femora. Tegmina generally completely developed, but often somewhat abbreviate, rarely lobate. Subgenital plate of male with the lateral margins very strongly ampliate and arched at the base, and furnished with a distinct but not very prominent subapical tubercle, the apical margin of the plate forming its inner base; furcula scarcely or not apparent; cerci tapering, apically very slender, simple; terminal segments of female abdomen more or less considerably abbreviated, the ovipositor only partially exerted.

Aeoloplus regalis may be taken as the type.

This genus is closely related to *Hesperotettix*, and these two genera are the only ones in the section of Melanopli with ampliate base to the lateral margins of the subgenital plate, in which the abdomen termi-

nates in a tubercle distinct from the margin itself, though it is a rather common feature in the alternate section; accordingly I have arranged these two genera in such an order that they directly follow those of the other section, and the remaining genera in such sequence as that arrangement required. It is composed of insects of a much heavier build than *Hesperotettix*, the principal distinctions between the two genera being given in the table (page 11).

The genus is confined to the western half of the United States from the Yellowstone to the Mexican border,¹ but it does not appear to have been found in California² or farther east than western Kansas and Nebraska; it does not reach the prairie region, and is mostly found apparently at elevations not far from 3,000 to 6,000 feet above the sea.

According to Bruner, *Aeoloplus turnbullii* and *Aeoloplus chenopodii*, and therefore probably all the members of the genus, or at least those of the division A¹ of the following table, are similar in their food habits, confining their attention "almost entirely to the various species of plants of the botanical family Chenopodiaceae, which abound in the regions where they occur, being particularly fond of the grease-wood, *Sarcobates vermicularis*."

ANALYTICAL KEY TO THE SPECIES OF AEOLOPLUS.

A¹. Pronotum longitudinally striped with lighter and darker colors; tegmina more or less (excepting in *Aeoloplus elegans*), though sometimes feebly, flecked with contrasting colors; lower genicular lobe of hind femora crossed by a dark basal band.

b¹. Tegmina at rest extending as far as or beyond the tip of the abdomen, particularly in the male.

c¹. Tegmina relatively long and slender, in the middle narrower than the prozona; wings elongate, fully twice as long as broad.

d¹. Smaller species, the males less than 15 mm. long; tegmina maculate; apical half of male cerci very slender..... 1. *tennipennis* (p. 70).

d². Larger species, the males scarcely less than 20 mm. long; tegmina immaculate; apical half of male cerci relatively stout..... 2. *elegans* (p. 71).

c². Tegmina relatively short and stout, in the middle as broad as the prozona; wings not elongate, distinctly less than twice as long as broad.

d¹. Tegmina and wings not or scarcely surpassing the abdomen in either sex; subapical tubercle of male abdomen prominent, about as high as broad.

3. *regalis* (p. 71).

d². Tegmina and wings much surpassing the abdomen in both sexes; subapical tubercle of male abdomen but slightly elevated, less than half as high as broad..... 4. *californicus* (p. 73).

b². Tegmina at rest falling distinctly, sometimes considerably, short of the tip of the abdomen.

c¹. Tegmina lobiform, not so long as pronotum..... 5. *chenopodii* (p. 74).

c². Tegmina merely abbreviate, about twice as long as pronotum.

d¹. Cerci of male tapering only in the basal half, the apical half slender and equal..... 6. *turnbullii* (p. 75).

d². Cerci of male tapering almost uniformly through the basal three-fourths, only the apical fourth equal..... 7. *plugosus* (p. 76).

¹And beyond it, for I have females of an undescribed species from San Louis Potosi.
²Though Bruner states that a species occurs on the "Pacific Coast."

A². Pronotum, tegmina (usually), and lower genicular lobe of hind femora unicolorous, unstriped.

b¹. Inferior base of hind femora of male with no depending tooth.

8. *uniformis* (p. 77).

b². Inferior base of hind femora of male with a distinct depending tooth.

c¹. Eyes of male moderately prominent, as seen from above less than half as high as long

9. *arizonensis* (p. 78).

c². Eyes of male very prominent, as seen from above fully half as high as long.....

10. *oculatus* (p. 79).

1. AEOLOPLUS TENUIPENNIS, new species.

(Plate V, fig. 5.)

Head pallid fuscous, flecked on the sides with brown and with a mediodorsal blackish brown stripe, which fills the narrow sulcus of the fastigium and passes backward much broadened, continuing with less depth of color but with equal width upon the pronotum, as far as the posterior limit of the prozona; a similar but weaker brown stripe passes from behind the eye a similar distance, broader and weaker upon the pronotum; antennae pale salmon red, paler at base; frontal costa equal, as wide as or slightly wider than the interval between the eyes, feebly sulcate below the ocellus; fastigium narrowly and rather deeply sulcate, the sulcation of equal width but varying depth. Ground color of pronotum yellowish brown, the posterior margin distinctly but obtusely and not sharply angulate, the disk of the prozona distinctly though but slightly transverse, with no median carina. Prosternal spine short, conical, erect. Tegmina considerably surpassing the abdomen, exceptionally slender, with very slight subbasal expansion of the costal area, subacuminate apically, brown, but with the larger distal portion pellucid, flecked with brown by the alternately deeper and lighter brown of the veins, the cross-veins mostly white or pellucid; wings not much shorter than the tegmina, not very broad, the veins blackish brown anteriorly, brownish blue in the anal area. Hind femora dull luteous, the outer face with three more or less confluent, transverse, blackish brown stripes, indicated by transverse fuscous cloudy bars on the upper faces, the arc of the geniculation heavily marked in black; hind tibiae pink, becoming gradually plumbeous distally, the spines pallid on the basal, black on the apical half. Supraanal plate of male subtriangular with sinuous sides and a produced and rounded apex, the surface plane or nearly plane, but with two pairs of very slight longitudinal ridges, one pair bounding the basal median sulcation, which narrows distally and terminates beyond the middle of the plate, the other lateral, oblique, and less sharp, proximally at the lateral margin, distally a little removed from it and terminating at a similar distance from the base as the other pair; furcula barely indicated by an attingent pair of scarcely projecting disks; cerci rapidly tapering at base, nearly the entire distal three fifths subequal, slender, cylindrical, straight, blunt-tipped, surpassing slightly the length of the supraanal plate; subapical tubercle of subgenital

plate moderately prominent, erect, somewhat sharply conical as seen from behind.

Length of body, male, 13.5 mm.; antennae, 6.5 mm.; tegmina, 11.25 mm.; hind femora, 8.5 mm.

One male. Fort Grant, Graham County, Arizona (U.S.N.M. [No. 13]).

2. AEOLOPLUS ELEGANS, new species.

(Plate V, fig. 6.)

Head pale greenish yellow, the vertex deeper yellow, with a medio-dorsal pale bluish green stripe from the front of the fastigium backward; antennae pale salmon, pallid at base and fuscous at tip; fastigium broadly and very shallowly sulcate throughout; frontal costa rather broader than the interspace between the eyes, equal, faintly sulcate below the ocellus. Pronotum very pale testaceous with a slight greenish tinge, more pronounced on the metazona, with a very broad pale bluish green mediodorsal stripe inclosing one of pale testaceous, and with some greenish clouds upon the lateral lobes of the prozona; posterior margin very obtusely angulate, the angle rounded; prozona feebly transverse with no median carina. Prosternal spine short, conical, erect. Tegmina considerably surpassing the abdomen, exceptionally slender for the genus, with scarcely any subbasal expansion of the costal area, tapering very gradually, the apex well rounded, subpellucid with greenish yellow veins; wings not much shorter than the tegmina, fully twice as long as broad, the veins greenish, faintly infuscated. Hind femora dull luteous, with three transverse fusco-olivaceous stripes, more or less confluent on the outer face; hind tibiae pale glaucous, the spines paler glaucous with black tips. Supraanal plate of male somewhat distorted in the only specimen seen, but apparently triangular, with slight median emargination of the sides and a shallow basal sulcus, bounded by convergent walls; furcula practically absent; cerci rather stout, tapering on the basal half, equal and hardly less than half as wide as the base on the apical half, the tip rounded and very feebly decurved; subapical tubercle of subgenital plate rather prominent, large, very bluntly conical.

Length of body (contracted), male, 18 mm.; antennae, 9 mm.; tegmina, 17.5 mm.; hind femora, 11 mm.

One male. Las Cruces, Donna Ana County, New Mexico, August 8, T. D. A. Cockerell (U.S.N.M. [No. 714]).

3. AEOLOPLUS REGALIS.

(Plate V, fig. 7.)

Caloptenus regalis DODGE, Can. Ent., VIII (1876), pp. 11-12.—BRUNER, *ibid.*, IX (1877), p. 145.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 43.—BRUNER, *ibid.*, III (1883), p. 60.

Melanoplus regalis BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 28.

Head yellow, more or less deeply tinged with testaceous, marked with a dark bluish green median stripe extending from the front of

the fastigium to the hinder margin, broadening posteriorly and continuing across the pronotum, where it is very much broader, broadest in the middle or at the hinder extremity and sometimes inclosing a slender thread or stripe of testaceous; there is also a lateral blue-green band, its upper limit at the summit of the lateral lobes of the pronotum, which starts from behind the eye and crosses the prozona, where it is much the widest, occupying from a third to a half the length of the lateral lobes, and occasionally suffusing the metazona; rest of pronotum brownish testaceous, sometimes with a yellow tinge; frontal costa equal, as wide as the interval between the eyes, slightly depressed at the ocellus; antennae orange. Pronotum obtusely angulate posteriorly, the median carina distinct on the metazona, feebly indicated on the prozona in the male and occasionally in the female. Prosternal spine rather slender, conical, reaching the level of the pectus. Tegmina generally slightly longer than the abdomen, especially in the male, sometimes only as long as it, rather broad, especially just beyond the base, brownish green, with darker green fleckings and yellowish cross-veins; beyond the subbasal enlargement they taper regularly and gently, the tip rounded; hind wings a little shorter than the tegmina, moderately broad, the veins bluish green, slightly infuscated next the costa. Hind femora testaceous yellow, with two broad angulate and sagittate blue-green bands, darkest above; hind tibiae pale blue-green, pallid at base and pallescent apically, the spines pallid, with the apical half blackish brown. Supraanal plate of male subtriangular, with broadly angulate sides, as long as broad, the acutely angulate tip rounded, the surface nearly plane but faintly elevated to the slight ridges which mark the boundaries of the rather broad and shallow median sulcus that extends over the basal half, narrowing slightly in its passage; there is besides, on either side, an oblique and narrow ridge, extending from the extreme outer base toward the middle of the distal half of the opposite side, terminating halfway there; furcula consisting of a pair of scarcely projecting, minute, attingent, angulate or subangulate lobes; infracercal plate as long as the supraanal, concealed by the recumbent cerci; cerci feebly compressed, of the length of the supraanal plate, tapering in the basal half, beyond slender, cylindrical, subequal, but apically tapering and feebly curved downward and inward; subapical tubercle of the subgenital plate moderately prominent, erect, very bluntly conical as seen from behind.

Length of body, male, 19.5 mm., female, 27.5 mm.; antennae, male, 8 mm., female, 9.75 mm.; tegmina, male, 14 mm., female, 19 mm.; hind femora, male, 11.5 mm., female, 16.5 mm.

Five males, 41 females. Cheyenne County, Kansas, F. W. Cragin (L. Bruner); Lakin, Kearny County, Kansas, 3,000 feet, July-September; between Smoky Hill, Kansas, and Denver, Colorado, L. Agassiz (Mus. Comp. Zool.); Pueblo, Colorado, July-August; Colorado, Morrison (S. Henshaw); Colorado (U.S.N.M.); Grand Junction, Mesa County, Colorado, June (L. Bruner); Pecos River, Texas, Captain Pope.

It has also been reported from Nebraska (Dodge) and Wyoming (Bruner).

The single specimen from Grand Junction is of an exceptionally small size, a female only 17 mm. long.

This is the largest species of the genus and is not uncommon at the eastern base of the Rocky Mountains in Colorado. I have considered it probable that this is the species described by Dodge under the name *Caloptenus regalis*, but the description does not very well apply to it. I am guided partly by a sketch of the markings of the tegmina sent me many years ago by Mr. Dodge, and partly by the impossibility of applying the description to any other known species.

4. *AECLOPLUS CALIFORNICUS*, new species.

(Plate V, fig. 8.)

Head luteo-ferruginous, with a broad, obscure fuscous, median stripe on the summit, not including the fastigium; frontal costa equal, as broad as the interspace between the eyes, plane; antennae bright orange. Pronotum obtusely angulate posteriorly, the angle rounded. the median carina generally feeble but sometimes distinct on the metazona, wanting on the prozona, the latter with a pair of approximate, anteriorly converging, dull olivaceo-fuscous, rather obscure, narrow stripes; on the upper half of the lateral lobes the transverse sulci are marked in fusco-olivaceous, and there are sometimes fuscous clouds in the same region, but nowhere distinct. Prosternal spine as in *Ae. regalis*. Tegmina much surpassing the abdomen in both sexes, at their broadest as broad as the metazona, beyond the subbasal enlargement tapering very gradually, the tip rounded, fulvo-testaceous, flecked feebly, especially along the middle, with fuscous, the longitudinal veins interruptedly fuscous and pallid in the apical half; wings slightly shorter than the tegmina, moderately broad, distinctly less than twice as long as broad, the veins and cross-veins glaucous. Hind femora and tibiae precisely as in *Ae. regalis*. Supraanal plate of male triangular, with strongly sinuate sides and produced and rounded apex, with a basal, apically narrowing, moderately broad median sulcus, bounded by sharp but low walls and reaching halfway across the plate, and an oblique ridge on each side, as in *Ae. regalis*, but much less prominent; furcula indicated merely by a pair of thickenings of the inner angles of the mesially parted terminal dorsal segment; cerci as in *Ae. regalis*, but with the apical portion less slender and straighter; infracercal plate just shorter than the supraanal, concealed by the recumbent cerci; subapical tubercle of subgenital plate feebly prominent, very blunt and rounded.

Length of body, male, 24.5 mm., female, 26.5 mm.; antennae, male, 9 mm., female, 8.5 mm.; tegmina, male, 22 mm., female, 23 mm.; hind femora, male, 13.5 mm., female, 14 mm.

One male, 4 females. California, Burrison (S. Henshaw).

This species is very closely allied to *Ae. regalis*, but has much longer tegmina, is slighter in form, has a less pronounced subapical tubercle to the male abdomen, and differs slightly in color and markings as well as in the abdominal appendages.

5. AEOLOPLUS CHENOPODII.

(Plate V, fig. 9.)

Pezotettix chenopodii BRUNER!, Ins. Life, VII (1894), pp. 41-42; Rep. St. Hort. Soc. Nebr., 1894 (1894), p. 163; Bull. Div. Ent. U. S. Dep. Agric., XXXII (1894), pp. 12-13.

Head varying from livid to warm testaceous, faintly, feebly, and sparsely punctate with brown, with mediodorsal and postocular stripes of black as in the neighboring species, the former generally broadening posteriorly and thereafter inclosing a yellow thread; antennae brownish yellow, pallid basally and infuscated apically; fastigium more or less shallowly sulcate in its narrowest part, the frontal costa about as wide as the space between the eyes, equal, nearly fading out before reaching the clypeus, and plane throughout. Pronotum testaceous, sometimes punctate with brown above, with a broad and posteriorly broadening mediodorsal blackish stripe on the prozona, including a similarly widening testaceous thread or stripe; upper half or rather less of the lateral lobes of the prozona with a similar more or less distinct blackish brown belt, generally accompanied by a testaceous dot at the middle of the upper margin; hinder margin of the pronotum hardly angulate, but well rounded in a uniform curve; median carina slight on the metazona, wanting or rarely indicated on the prozona. Prosternal spine short, conical, rather blunt. Tegmina subovate, less than twice as long as broad, apically obliquely truncate in the female, not pointed, fuliginous, with crowded brownish and yellowish veins. Hind femora luteo-testaceous, with three broad, transverse angular bands of bluish black, which are but little confluent on the outer face and somewhat less conspicuous on the upper face, the genicular are black; hind tibiae pale glaucous (sometimes pink, according to Bruner) with the knee and a subbasal annulus pale yellow; the spines black with pallid base. Supraanal plate of male triangular with faintly sinuous sides and roundly pointed apex, the surface flat but with a pair of convergent, rather sharp, but only slightly elevated ridges, inclosing a rather narrow basal longitudinal sulcus, not reaching the middle of the plate; there are besides two short, strongly oblique, blunt ridges on the basal half, fading at their extremities; furcula wholly wanting; cerci moderately broad and compressed at base, tapering gradually and regularly over a little more than the basal half, beyond subequal, subcylindrical, but pointed, the apex scarcely incurved and extending scarcely beyond the supraanal plate; subapical tubercle of subgenital plate small, directed upward and backward, very short and bluntly conical as viewed from behind.

Length of body, male, 17 mm., female, 20.5 mm.; antennae, male, 6.5 mm., female, 6 mm.; tegmina, male, 3 mm., female, 3.75 mm.; hind femora, male, 9.5 mm., female, 10 mm.

Two males, 2 females. Grand Junction, Mesa County, Colorado, June, L. Bruner.

6. AEOLOPLUS TURNBULLII.

(Plate V, fig. 10.)

Caloptenus turnbullii THOMAS!, Ann. Rep. U. S. Geol. Surv. Terr., V (1872), p. 452, pl. II, fig. 10; Rep. U. S. Geol. Surv. Terr., V (1873), p. 158; Rep. U. S. Ent. Comm., I (1878), p. 42.—GLOVER, Ill. N. A. Ent., Orth. (1872), pl. XI, fig. 10.—SCUDDER!, Can. Ent., XII (1880), p. 75.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 60; Bull. Div. Ent. U. S. Dep. Agric., IV (1884), p. 58.

Melanoplus turnbullii BRUNER, Bull. Washb. Coll., I (1885), p. 139; Publ. Nebr. Acad. Sc., III (1893), p. 28.

Head varying from pallid testaceous to brownish testaceous, the genae sometimes clouded with fuscous; a broad blackish stripe, usually broadening posteriorly, extends from the front of the fastigium across the summit, nearly occupying the whole of the fastigium except the sides of the expanded portion and sometimes invading this; a broader band extends longitudinally behind the eyes; antennae pale salmon red, more or less deeply infuscated apically; fastigium not sulcate; frontal costa nearly or quite as broad as the narrowest space between the eyes, shallowly sulcate below the ocellus. Pronotum varying from testaceous to dark brownish yellow, the metazona generally feebly infuscated in parts, especially on the disk, the prozona and generally the front half of the metazona with a broad, obscurely bordered, blackish fuliginous, mesial stripe, sometimes including a yellowish thread; upper half of the lateral lobes of the prozona similarly colored, forming a broad bar, which sometimes extends as a cloud upon the metazona; posterior margin obtusely angulate, the angle rounded; median carina on the metazona only. Prosternal spine conical or pyramidal, rather pointed, moderately long. Tegmina brown, variably flecked with dull yellowish, the basal portion of the anal vein often so marked, falling distinctly short of the tip of the abdomen, the costal margin somewhat but not greatly expanded beyond the base, beyond tapering regularly, the tip well rounded; wings at rest protruding slightly beyond the tegmina. Hind femora clay yellow, thrice broadly banded with blue black, the bands generally more or less blended on the outer face, the whole genicular arc inky black; hind tibiae glaucous, suffused apically with pale yellow, and with a narrow subbasal yellowish annulus, the pallid spines black tipped, the tarsi clay yellow. Supraanal plate of male triangular, the apex acute and bluntly pointed, the sides nearly straight, the surface feebly arched, with a basal, triangular, apically narrowing sulcus, which hardly extends to the middle of the plate and is bounded by sharp walls; a short, moderately sharp but low, oblique ridge starts from the outer base of the plate and runs a similar dis-

tance; furcula consisting of a pair of adjacent, obtusely angled, scarcely projecting, small lobes; cerci long and slender, fully as long as the supraanal plate, tapering not rapidly and on the basal half only, the apical half slender, a little compressed, slightly arcuate, and feebly downcurved apically; subapical tubercle of subgenital plate moderate, suberect, as viewed from behind very bluntly conical.

Length of body, male, 18 mm., female, 23 mm.; antennae, male, 7.25 mm., female, 7.8 mm.; tegmina, male, 10 mm., female, 13 mm.; hind femora, male, 9.5 mm., female, 12 mm.

Nine males, 6 females. Yellowstone, Montana, October 9, C. V. Riley (U.S.N.M.); Sweetwater, Wyoming, Thomas (U.S.N.M., [No. 715]); Wyoming, Morrison (U.S.N.M.); Newcastle, Weston County, Wyoming (L. Bruner); Gordon, Sheridan County, Nebraska, August (L. Bruner); Explorations in the Upper Missouri and Yellowstone, F. V. Hayden.

The species was originally reported from "between Red Buttes and Independence Rock, Wyoming," but it has since been recorded by Bruner (doubtless in some cases by mistake for some of the allied species here first separated) from Garden City, Finney County, Kansas, western Nebraska, Arizona, New Mexico, Montana and the Pacific Coast.

According to Bruner, this species in the Yellowstone region "only feeds upon two species of plants, as nearly as I could ascertain by observation, viz., the 'pigweed' and a small greenish white plant of a similar nature. Those found on the pigweed are somewhat glaucous yellow, while those feeding on the other plant are more of a whitish color, mingled with greenish blue instead of greenish yellow," the color of the insects resembling to a considerable degree that of the plants on which they feed.

7. AEOLOPLUS PLAGOSUS.

(Plate VI, fig. 1.)

Pezotettix plagosus SCUDDER!, Ann. Rep. Chief Eng., 1876 (1877), p. 504; Can. Ent., XII (1889), p. 75.

Brownish yellow marked with dark brown or brownish fuscous; especially noticeable is a dark mediadorsal stripe, extending from the middle of the vertex between the eyes, where it is not half so broad as the interspace, to or nearly to the posterior end of the pronotum, broadening as it goes, on the posterior half of the pronotum inclosing a median pale line and fading out before the end of the metazona; there is also a broad dark belt at the upper limit of the lateral lobes on the prozona, extending forward to the eyes and fading inferiorly; interspace between the eyes slightly broader than the frontal costa, the fastigium broadly and rather shallowly sulcate, the frontal costa equal, narrowly sulcate below the ocellus. Pronotum broadening slightly posteriorly, the metazona punctate, the median carina distinct only

here, the slight lateral carinae moderately abrupt and obtuse, the posterior border obtusely angulated, the angle rounded. Prosternal spine very short, straight, stout, pyramidal, pointed. Tegmina not much shorter than the abdomen, obscure brown, mottled with many pale and darker spots (due to the broken color of the veins), mostly arranged longitudinally in the median field; the costal field is broadly enlarged near the base, and beyond it the whole tapers nearly to the rounded tip; veins of the apical half of the preanal field of the wings dusky or blackish. Hind femora with two median, angulate, moderately broad, brownish fuscous bands, the arc of the geniculation black; hind tibiae pale dull glaucous, pale at the base, the spines black-tipped. Supranal plate of male triangular, nearly as long as broad, flat, with a shallow median furrow of moderate width in the basal half and a slender mesial groove at apex; furcula consisting of a pair of minute, attingent, triangular lobes; cerci broad at base, rapidly tapering on the compressed, conical, basal half, very slender and nearly equal on the apical half, a little incurved at tip; subanal tubercle of subgenital plate rather small, erect, appressed, slightly conical as seen from behind.

Length of body, male, 18.5 mm., female, 21 mm.; antennae, male, 8 mm., female, 7.5 mm.; tegmina, male, 11 mm., female, 11.2 mm.; hind femora, male, 10.5 mm., female, 11.8 mm.

One male, 1 female. Northern New Mexico, August to September, Lieutenant W. L. Carpenter.

I have seen no other males of this species since its first description, but I have before me three new females, which from the greater brevity of their tegmina I am inclined to place here rather than in *Ae. turnbullii* (from which the females at least are with difficulty separated), and which come from Colorado (Cañon City, Fremont County, Morrison and Uhler.—U.S.N.M. [No. 716]). The specimen collected by Morrison was obtained on the plains at an elevation of 5,000 feet, and is almost wholly grass-green with the lighter parts yellowish green.

8. AEOLOPLUS UNIFORMIS, new species.

(Plate VI, Fig. 2.)

The color of the only specimens seen are probably changed somewhat from their having been killed in spirits and are now of a light dead-leaf color; probably in life they were uniformly testaceous, with perhaps a greenish tinge. The pronotum shows, at least on the prozona, signs of a broad, paler, mediodorsal band, and a similar band on the middle of the lateral lobes; the outer face of the hind femora shows indications of a pair of dusky transverse bands, mesial and extramesial, and the apical half or more of the hind tibial spines are black. The fastigium of the vertex is scarcely in the least impressed, excepting at its very base between the eyes; the frontal costa has a row of puncta on either side,

removed from the margin, and below the ocellus it is narrowed, sulcate, and fails to reach the clypeal suture. Prozona feebly and sparsely, metazona densely and rather strongly, punctate on the disk, the former anteriorly with a submarginal transverse series of more distinct puncta, becoming mesially a double series; the posterior sulcus of the prozona swerves broadly backward and is completely continuous; that in front of it is rather short, not infringing on the lateral lobes, rigidly transverse and feebly continuous. Supraanal plate of male triangular, with almost straight lateral margins, subacuminate apex, fully as long as broad, with a pair of submedian, subparallel, rather elevated ridges, fading posteriorly, inclosing a deep median sulcus; furecula consisting only of a rather distinct but obtuse angle on either side of a rectangular median emargination of the last dorsal segment; cerci very slender (slenderer than appears by the figure), as long as the supraanal plate, tapering considerably in the basal half, equal and very feebly incurved in the apical half, apically blunt; infracercal plates rather broad, hardly narrowing apically, shorter than the infraanal plate.

Length of body, male, 17.25 mm., female, 18.5 mm.; antennae, male, 7 mm., female, 5.7 mm.; tegmina, male, 16 mm., female, 9 mm.; hind femora, male, 8.3 mm., female, 10.2 mm.

One male, 1 female. Fort Whipple, Yavapai County, Arizona. E. Palmer; Truckee Valley, Nevada, R. Ridgway.

The tegmina are considerably larger than the abdomen in the male from Arizona; somewhat shorter than the abdomen in the female from Nevada. I am not at all confident that the two belong together, and my description is therefore based almost wholly upon the male.

9. *AEOLOPLUS ARIZONENSIS*, new species.

(Plate VI, fig. 3.)

Hesperotettix viridis SCRIPPER!, Ann. Rep. Chief Eng., 1876 (1876), p. 506; Ann. Rep. Geol. Geogr. Surv. 100th mer., 1876 (1876), p. 286.

Uniform in coloring throughout, and probably testaceous (all specimens seen have been immersed in alcohol), except that the transverse sulci of the pronotum appear to have been marked with black or fuscous, there are some slight fuscous markings on the upper half of the lateral lobes of the prozona, the tegmina are clouded and obscurely dotted with fuscous, the hind femora are sometimes twice barred with fuscous and have a large fuscous lunule on the geniculation, and the tibial spines are black tipped. The eyes of the male are tolerably prominent; the fastigium, except at apex, is distinctly and uniformly but not deeply sulcate; the frontal costa is subequal, depressed at but not sulcate below the ocellus, percurrent. Prozona punctate above only in the submarginal sulcus; metazona densely and rather strongly punctate; posterior sulcus of the prozona oblique on either side, making a very open rounded angle mesially, and percurrent, while that next in front of it is occasionally subobliterated mesially. Tegmina considera-

bly longer than the abdomen in the male, nearly or quite as long as the abdomen in the female. Supraanal plate of male subtriangular, with a slight, rounded, lobiform, apical prolongation, the surface nearly flat, with a slight, rather broad median sulcus on the basal half or more; furcula consisting of a pair of very slightly projecting but moderately large, rounded, attingent lobes; cerci compressed more than commonly in this genus, broad at base, tapering pretty regularly in the basal two-thirds, mostly by the excision of the upper side, beyond equal, apically bluntly rounded, scarcely incurved; infracercal plates apically narrow, nearly as long as the supraanal plate.

Length of body, male, 19 mm., female, 23 mm.; antennae, male, 7.75 mm., female, 7.25 mm.; tegmina, male, 16.25 mm., female, 16 mm.; hind femora, male, 10.1 mm., female, 11.75 mm.

Five males, 4 females. Fort Whipple, Yavapai County, Arizona; Mohave Desert, Loew (U.S.N.M. [No. 717]).

This species differs slightly from *Ae. uniformis* in markings, but more in the sculpture of the face and of the male abdominal appendages, which are very distinct in the basal breadth of the cerci and the flatness of the supraanal plate.

10. AEOLOPLUS OCULATUS, new species.

(Plate VI, fig. 4.)

Pale yellowish testaceous, uniform, the only variations from it being in the pale reddish antennae, chocolate brown eyes, the faint, fuscous, crowded, and delicate punctuation of the submarginal sulcus of the prozona and of the whole of the metazona, the bluish main rays of the wings, the feeble, plumbeo-fuscous, sagittate banding of the hind femora, the narrow purplish crescent of the genicular lobes and the very pale purplish hind tibiae, the spines of which are yellowish in the basal, black in the apical half. The eyes of the male are very large and prominent, the fastigium pretty deeply and rather narrowly sulcate between the eyes, the frontal costa moderately broad, subequal, nowhere sulcate, and rather indistinctly percurrent. Posterior sulcus of the prozona swerving backward mesially to form a very broad W, and yet in the middle much nearer the sulcus in front than that behind; sulcus in front of it percurrent, straight, but angularly bent forward laterally. Tegmina considerably longer than the abdomen in the male. Supraanal plate of male triangular, with the apex slightly produced and rounded, nearly flat, with a rather broad and shallow median sulcus, suddenly narrowed and almost immediately terminated in the middle of the plate, the margins sharply defined; furcula consisting of a pair of juxtaposed, small, rounded lobes, scarcely perceptible by any projection; cerci broad at base and equal on basal fifth, but in the next two fifths rapidly tapering, almost entirely by the falling slope of the upper side, beyond subequal, bluntly pointed, longer than the supraanal plate

and feebly compressed basally, scarcely incurved; infracercal plate as long as the supraanal by the apical prolongation of the narrowing plate.

Length of body, male, 17 mm.; antennae, 6 mm.; tegmina, 15 mm.; hind femora, 9.25 mm.

One male. Mohave, Arizona, Wickham (L. Bruner).

In details of structure this species closely resembles *Ae. arizonensis*, but is remarkable for its compressed form and its large and prominent eyes, in which points it exceeds even that species.

19. BRADYNOTES.

(βραδύνω, to loiter.)

Bradynotes SCUDDER, Can. Ent., XII (1880), p. 76.

Body stout, compact, heavy, generally, and especially in the female, very broad at the metathorax. Head stout, slightly broader below than above, the genae full; eyes separated by a wide space, wider and generally much wider than the broad frontal costa; front well rounded, vertical, the frontal costa prominent, broad, and generally somewhat sulcate, at least above; antennae slender for such bulky insects, equal, shorter and generally much shorter than the hind femora. Thorax very stout, the pronotum very short, not covering the whole of the mesonotum, truncate at either extremity, the metazona only about half as long as the prozona and rugulose, while the prozona is smooth; lateral lobes sometimes separated from the dorsum by distinct rugae. Prosternal spine very much abbreviated, becoming in the female a mere blunt tubercle, and in the male very short and conical; mesostethium and metastethium together, in both sexes, but particularly in the female, no longer or scarcely longer than broad; the interspace between the mesosternal lobes wide in both sexes, but showing a remarkable degree of variation quite unknown in any other of the genera of Melanopli: the metasternal lobes distant, sometimes very distant, in the female, approximate or moderately distant in the male. Tegmina and wings altogether wanting. Fore and middle femora of male tumid; hind femora (excepting in *B. hispida*) rather short, moderately stout, reaching beyond the abdomen in the male, but generally not in the female, the upper carina smooth. Terminal abdominal joints of the female short, with slightly exerted ovipositor, making the tip blunt, as in *Oedaleonotus* and *Aeoloplus*, but perhaps to a greater degree; abdomen of male apically clavate, upturned, the subgenital plate long and tumid, without apical tubercle; furcula absent or (in one species) represented by feeble lobes; cerci simple, conical, straight.

B. obesa (Thomas) is the type.

This somewhat remarkable genus is, so far as known, confined to the extreme northwestern United States, but will probably be found also in British Columbia. It extends from the Pacific to Montana and Wyoming, and has so far been reported only north of the latitude of

392. Excepting the monotypic *Asemoplus* found in the same region, and some of the genera peculiar to the South, no other genus of Melanopli has so limited a range.

ANALYTICAL KEY TO THE SPECIES OF BRADYNOTES.

A. Interspace between the eyes not much greater than the least width of the frontal costa; hind femora fully three times as long as pronotum and relatively slender; last dorsal segment of male abdomen with slight lobes for furecula.... 1. *hispidus* (p. 81).

A. Interspace between the eyes nearly twice the least width of the frontal costa; hind femora distinctly less than three times as long as pronotum and relatively stout; last dorsal segment of male abdomen quite unarmed.

b. Interspace between mesosternal lobes not (male) or at most a little (female) wider than the lobes themselves, the metasternal lobe varying from subcontiguous to a little more than half as distant as the mesosternal (male), or from more than half to nearly as distant as the mesosternal lobes (female); male cerci about as long as the supraanal plate.

c. Interspace between mesosternal lobes scarcely more than half the width of the lobes themselves (male) or not wider than they (female), the metasternal lobes subcontiguous (male); last segment of male abdomen not greatly upturned.

d. Interspace between mesosternal lobes of male scarcely more than half the width of the lobes themselves, the metasternal interspaces in the female hardly more than half as broad as the mesosternal..... 2. *caurus* (p. 83).

d. Interspace between mesosternal lobes of male almost as wide as the lobes, the metasternal interspace in the female fully three-quarters that of the mesosternal..... 3. *expleta* (p. 84).

e. Interspace between mesosternal lobes about equal to the width of the lobes themselves (male) or a little wider (female), the metasternal lobes moderately distant (male) or fully three-fourths as wide as the mesosternal interspace (female); last segment of male abdomen considerably upturned.

d. Hind tibiae wholly coral red..... 4. *pinguis* (p. 85).

d. Hind tibiae red only on apical half.

e. Relatively large. No great contrast in color between upper and lower half of lateral lobes of pronotum, the lower portion not being very light; dark cross bands of hind femora crossing only the inner, not (or obscurely) the outer half of the upper surface; outer face almost uniformly dark.

5. *obesa* (p. 87).

e. Relatively small. The darker superior half of lateral lobes of pronotum strongly contrasted with the lighter inferior half; dark cross bands of hind femora crossing both inner and outer half of upper surface, the outer face broken in color by their continuation..... 6. *referta* (p. 88).

b. Interspace between mesosternal lobes considerably wider than (male) or twice as wide as (female) the lobes themselves, the metasternal lobes nearly as distant; male cerci not half so long as the supraanal plate..... 7. *saturnus* (p. 89).

I. BRADYNOTES HISPIDA.

(Plate VI, fig. 5.)

Pezotettix hispidus BRUNER!, Can. Ent., XVII, 1885, pp. 12-14.

Body moderately stout, very slightly compressed, but little enlarged in the metathoracic region, even in the female, feebly pilose. Head full, the vertex gently tumid, the interspace between the eyes not much greater than the least width of the frontal costa, the fastigium considerably declivate, slightly expanding apically, broadly sulcate,

anteriorly punctate in the male, the lateral margins moderately prominent but rounded; frontal costa moderately broad, a little broader than the basal joint of the antennae, subequal, sulcate below the ocellus and sparsely punctate; eyes moderately large, more prominent in the male than in the female, about as long as the infraocular portion of the genae, anteriorly truncate, especially in the female; antennae a little more (male) or a little less (female) than half as long again as head and pronotum together. Pronotum subequal, in the female feebly constricted in the middle and slightly broadened posteriorly; metazona less than half as long as the prozona, the posterior sulcus of the latter as distinct as the anterior which divides it in the middle, all the sulci cutting the slight and equal median carina; posterior margin truncate or very faintly and broadly emarginate; mesonotum fully half (male) or distinctly less than half (female) as long as the metanotum. Interspace between the mesosternal lobes a little cuneiform, about as large as (male) or a little larger than (female) the slightly transverse lobes; interspace between the metasternal lobes much less than half (male) or considerably more than half (female) the width of the mesosternal interspace. Fore and middle femora of male considerably but not greatly inflated; hind femora slender, twice as long as head and pronotum together. Abdomen relatively slender, with a sharp but slight median carina, the extremity scarcely enlarged in the male (as viewed from above) and but gently upturned; supraanal plate of male shield shaped, the proximal half of the lateral margins ridged and the broad median sulcus margined with prominent ridges, higher in the proximal than the distal half; furcula consisting of a pair of small, moderately distant beads; cerci as long as the supraanal plate, subconical, but tapering much more rapidly in the basal than the apical half, the tip very feebly down-curved; infracereal plate of either side large, sulcate, much exposed, nearly meeting its mate, and extending slightly beyond the supraanal plate.

The body is brownish ochraceous, heavily banded with blackish brown, the proportions of the two varying somewhat. The head (excepting the vertex and a broad stripe behind the eyes which are blackish brown) and the fore and middle legs are dirty ochraceous, darker in the female than in the male, with an olivaceous tinge, and the same color is found on the whole under surface of the body and the lower half or less of the lateral lobes of the pronotum; the broad dark band behind the eyes extends across the upper half of the lateral lobes and the whole of the abdomen, bordered above by an ochraceous stripe, which begins between the eyes, bordering their upper margin, and continues to the end of the abdomen, often becoming duller in color as it approaches the extremity and is more narrowly separated from its mate; sometimes a darkening dark stripe, which occupies most of the vertex of the head and is always broader anteriorly than posteriorly, is interrupted at the metazona and on the meso- and metanota, so that the lighter bands unite. Hind femora varying from brownish

to yellowish fuscous, feebly clouded, especially above, with fuscous in the middle and in the middle of the distal half, the under and inner surfaces more or less deeply tinged with coral red; hind tibiae and tarsi fusco-luteous, only the apical half or less of the spines blackish or brown.

Length of body, male, 18.5 mm., female, 21 mm.; antennae, male, 9.5 mm., female, 10.5 mm.; pronotum, male, 3.6 mm., female, 4.5 mm.; hind femora, male, 10.75 mm., female, 12.5 mm.

One male, 3 females. Colville Valley, eastern Washington, July 24 (L. Bruner; Museum Comparative Zoology).

In the exceptional length of the hind femora; the feeble metathoracic enlargement of the body, and the development of the furcula, as well as in some minor features, this is the most aberrant species of the genus.

2. BRADYNOTES CAURUS, new species.

(Plate VI, fig. 6.)

Bradynotes opimus BRUNER!, Can. Ent., XVII (1885), p. 15.

Body similar in shape and clothing to *B. hispida*. Head full, the vertex gently tumid, the interspace between the eyes twice as great as the least width of the frontal costa, the fastigium strongly declivent, narrowing rather than expanding anteriorly, broadly but shallowly sulcate, the lateral margins rather prominent but rounded; frontal costa rather broad, much broader than, sometimes twice as broad as, the basal joint of the antennae, generally a little sulcate throughout, especially in the male, punctate at the margins; eyes not very large, scarcely more prominent in the male than in the female, about as long as the infraocular portion of the genae, anteriorly truncate particularly in the female; antennae a little longer (male) or a little shorter (female) than the head and pronotum together. Pronotum subequal, expanding posteriorly a very little, especially in the female; metazona half (female) or slightly less than half (male) as long as the prozona, the sulci of the latter equally indistinct, and neither of them cutting the median carina, which is nearly obliterated on the prozona, especially in the female; posterior margin as in *B. hispida*; mesonotum more than half (male) or less, sometimes much less, than half (female) as long as the metanotum. Interspace between the mesosternal lobes as wide (female) or hardly more than half as wide (male) as the lobes themselves, the metasternal lobes subcontiguous (male) or half as distant as the mesosternal (female). Fore and middle femora of male somewhat inflated; hind femora short but not very stout, hardly half as long again as head and pronotum together. Abdomen relatively rather slender with a slight and blunt median carina, the extremity scarcely enlarged in the male, as viewed from above, and but gently upturned. Supraanal plate of male subtriangular with rounded apex, about equally long and broad, tumid by reason of a pair of very coarse, elevated, rounded ridges, with a

very deep basal sulcus between them; furcula absent; cerci slightly longer than the supraanal plate, subconical, faintly compressed, a little downcurved apically, tapering with regularity; infracercal plates inconspicuous.

Body griseo fuscous, mottled, the face and inferior surface of body sordid brownish yellow, feebly punctate with fuscous. Vertex and fastigium brownish fuscous, the lateral margins of the latter feebly enlivened with orange, and the former mottled or streaked with livid brown. Both thorax and abdomen are heavily mottled with blackish fuscous, much more heavily in some individuals than in others, which is apt to be conspicuous in a pair of subdorsal bands, sometimes confined to the posterior edges of the segments, and to leave a narrow lighter dorsal stripe between them; the lower portion of the lateral lobes of the pronotum is always lighter than the upper half, which is often marked by a more or less distinct, sometimes abbreviated, broad black or blackish band, generally deeper in tint on its inferior half. Hind femora blackish fuscous feebly clouded with dull yellowish, the whole under surface and under portion of its outer face clay yellow; hind tibiae light coral red (male) or dark coral red on apical half and extreme base, passing into purplish red on the basal half (female). The spines blackish on their apical half at most.

Length of body, male, 16.75 mm., female, 21 mm.; antennae, male, female, 6.5 mm.; pronotum, male, 3.65 mm., female, 4.5 mm.; hind femora, male, 10 mm., female, 11.75 mm.

Two males, 6 females. Yakima River opposite Ellensburg, Kittitas County, Washington, July 8-9 (Museum Comparative Zoology; U.S.N.M. [No. 718]); Camp Umatilla, Washington, June 27 (Museum Comparative Zoology); Oregon City, Clackamas County, Oregon, July, W. G. W. Harford.

3. BRADYNOTES EXPLETA, new species.

(Plate VI, fig. 7.)

Body similar in shape and clothing to *B. hispida*, except that it is relatively a trifle stouter at the metathorax, especially in the female. Head broad and full, the vertex gently tumid, the interspace between the eyes nearly or quite twice as great as the least width of the frontal costa, the fastigium strongly declivent, shallowly sulcate, the lateral margins rather prominent, especially in the male, but rounded; frontal costa rather broad, considerably broader than the basal joint of the antennae, feebly sulcate if at all, and sparsely punctate, especially at the margins; eyes as in *B. caurus* (antennae more or less broken in all specimens seen). Pronotum regularly expanding posteriorly, very slightly in the male, distinctly but not greatly in the female; metazona about half as long as the prozona, the sulci of the former equally but feebly impressed, all cutting the feeble median carina, which is obsolete on the prozona in the female; mesonotum nearly half (female) or

much less than half (male) as long as the metanotum. Interspace between the mesosternal lobes almost as broad as the lobes themselves (male, female), the metasternal lobes slightly distant (male) or fully three-fourths as distant as the mesosternal lobes (female). Femora as in *B. caurus*. Abdomen relatively slender, compressed, with a distinct but not prominent median carina, the extremity in the male slightly enlarged, as seen from above, and somewhat upturned; terminal appendages of male differing from those of *B. caurus* only in that the supraanal plate is a little more pointed, and the cerci coarser, a trifle shorter, more bluntly tipped, and not curved downward so much apically.

Body brownish fuscous above, sordid yellow below. Face livid brown, flecked with fuscous points; the ridged margins of the fastigium coral red, at least in the male; behind the eyes, in front of the position for the lateral carinae of the pronotum, is the beginning of a slender and feeble yellowish stripe, which crosses interruptedly to the pronotum and is there lost; below it, the upper half of the lateral lobes are dark brown, almost blackish, at least on the prozona, while below the lobes are much lighter colored. The abdomen is more or less flecked, especially laterally, at the posterior margins of the segments with testaceous, and there is a more or less conspicuous or broken piceous lateral band on the basal half of the abdomen. The hind femora are colored as in *B. caurus*, but the hind tibiae are coral red in the male, sordid yellow apically tinged with red in the female, feebly incurved, the spines black tipped. Lower external half of anal cerci of male distinctly darker than the upper.

Length of body, male, 16.25 mm., female, 28 mm.; pronotum, male, 4 mm., female, 4.5 mm.; hind femora, male, 8.25 mm., female, 14 mm.

Two males, 1 female. Easton, Kittitas County, Washington (U.S.N.M. [No. 719]).

This species is very closely allied indeed to *B. caurus*.

4. BRADYNOTES PINGUIS, new species.

(Plate VI, fig. 8.)

Body stout and clumsy, considerably enlarged in the metathoracic region, especially in the female, weakly and briefly pilose. Head full, the vertex gently tumid, the interspace between the eyes broad, about twice the breadth of the narrowest part of the frontal costa, the fastigium strongly declivent, considerably but broadly sulcate, its lateral margins ridged, continuous with the sometimes elevated, always dark-colored borders of the frontal costa; the latter broad, much broader than the basal joint of the antennae, variably sulcate punctate but sparsely except on the margins; eyes rather large, more prominent in the male than in the female, equally truncate anteriorly in the two sexes, as long as the infraocular portion of the genae; antennae somewhat longer (male) or a trifle shorter (female) than head and pronotum together.

Pronotum regularly, and in the female considerably, enlarging posteriorly, with distinct (male) or indistinct (female) lateral carinae on the prozona, which is twice (male) or almost twice (female) as long as the metazona, its sulci approximated and equally distinct, but not so distinct as that separating the pro- and metazona and, unlike it, not cutting the median carina, which is yet often subobsolete on the prozona and especially on its posterior half, particularly in the female; exposed portion of mesonotum about half (male) or hardly more than a fourth (female) as long as the metanotum. Interspace between the mesosternal lobes three-fourths (male) or fully (female) as wide as the lobes themselves, the metasternal interspace half (male) or three-fourths (female) the width of the mesosternal interspace. Fore and middle femora pretty strongly inflated and arcuate in the male, the hind femora stout and heavy, hardly if at all more than half as long again as head and pronotum combined, the hind tibiae stout. Abdomen stont, tapering and then apically enlarged and considerably upturned in the male; supraanal plate of male triangular, shorter than its basal breadth, with a pair of broad, gently tumid ridges, which unite into a single median ridge, leaving between them in the basal half a shallow sulcus; furcula wanting; cerci as long as the supraanal plate, subconical, slightly compressed, tapering a little more rapidly in basal than in apical half, rather blunt at tip, straight throughout; infracereal plate much shorter than the supraanal, scarcely perceptible.

Body brownish fuscous above much marked with clay yellow, beneath almost wholly clay yellow, more or less infuscated in the female. The head is more or less obscure yellow, the vertex at summit brownish fuscous, limited at most to a narrow median and two equally narrow submedian streaks, the latter continued along the marginal ridges of the fastigium down the sides of the frontal costa, but at the apical third of the fastigium more or less interrupted by or suffused with dull red; the antennae are yellow at base, gradually passing into fuscous. On the dorsum of the thorax and the front at least of the abdomen, the fuscous is more or less obscurely punctate or flecked with yellowish, and along the median line of the abdomen there is a distinct yellowish stripe beginning on the meso- and metanota as a mere thread; the prevailing tint of the lateral lobes of the pronotum is yellowish, but there is a more or less distinct blackish fuscous oblique bar on the prozona just above the middle, merging posteriorly in the general obscurity of the metazona; there is a distinct broad blackish fuscous oblique band crossing the meso- and metapleura, and the middle of the sides of the basal abdominal segments are piceous. The fore and middle legs are fusco-luteous; the hind femora yellowish, more or less obscured with fuscous and spotted with fuscous on the inner upper face and the outer face, which is generally almost black along its upper half; hind tibiae and tarsi coral red, brighter in the male than in the female, the external series of spines yellow with black apices. The sides of the supraanal plate of

the male show a black stripe, and the cerci, mesially yellow, are obscured with fuscous both above and below.

Length of body, male, 23 mm., female, 25.5 mm.; antennae, male, 8 mm., female, 9 mm.; pronotum, male, 4.75 mm., female, 5.5 mm.; hind femora, male, 12.5 mm., female, 14.25 mm.

Five males, 2 females. Washington, Morrison (U.S.N.M. [No. 720]); Reno, Washoe County, Nevada, Hillman (L. Bruner). Other specimens of Morrison's collecting in the collection of Mr. S. Henshaw were labeled by Morrison as coming from North Carolina, but of course by mistake; in all probability they came from Washington; he collected in both these States.

5. BRADYNOTES OBESA.

(Plate VI, fig. 9.)

Pezotettix obesus THOMAS!, Ann. Rep. U. S. Geol. Surv. Terr., V (1872), pp. 454-455, pl. II, figs. 13, 14.—GLOVER. Ill. N. A. Ent., Orth. (1872), pl. II, figs. 13, 14.—THOMAS!, Rep. U. S. Geol. Surv. Terr., V (1873), p. 146; Proc. Dav. Acad. Nat. Sc., I (1876), p. 259.—STÅL, Bih. K. Sv. Vet.-Akad. Handl., V, No. 9 (1878), p. 15.

Bradynotes obesa SCUDDER!, Can. Ent., XII (1880), pp. 75-76.

Bradynotes opimus SCUDDER!, Rep. U. S. Ent. Comm., II (1881), app., p. 24.

Body wholly similar in form and clothing to that of *B. pinguis*, or it is even stouter in the metathoracic region in the female. Head not differing essentially from *B. pinguis*, and eyes and antennae with the same structure. Pronotum with similar but rather less distinct and continuous lateral carinae; metazona half (male) or distinctly less than half (female) the length of the prozona, the two sulci of the latter approximated, the hinder of them less distinct than the anterior, which is as well marked as that separating the prozona from the metazona, but neither traverse the median carina, which is equal and distinct though slight throughout; exposed portion of mesonotum half (male) or much less than half (female) as long as the metanotum. Sternal interspaces as in *B. pinguis*, as also the femora. Abdomen stout, with a more or less distinct median carina, in the male tapering and then apically enlarging and upturned; supraanal plate of male triangular, as long as its basal breadth, otherwise as in *B. pinguis*; furcula absent; cerci as long as the supraanal plate, straight, tapering regularly in the basal three-fifths, beyond equal or subequal, blunt tipped; infracercal plates blunt tipped, reaching the tip of the supraanal plate.

General color blackish griseous, more or less flecked with brown. Face and genae below the eyes varying from pale to pinkish livid, punctate with black, especially below, and divided by black stripes following the edges of the frontal costa and the lateral carinae of the face and also, generally, the arcuate posterior carinae of the genae, and an oblique line of punctures subparallel to it below the middle of the genae; summit of head with a median and a pair of arcuate lateral narrow black stripes,

the former the darker, the latter extending upon the lateral margins of the fastigium, on the anterior part of which they are supplanted by red; antennae testaceous near the base, blackish beyond. Prozona with a large central blackish spot on the disk, inclosing a pair of testaceous dots, laterally disposed; anterior and posterior margins of the pronotum, especially in the female, occasionally enlivened feebly with red; lateral lobes lighter below than above, speckled, with a broad, somewhat broken, black median band crossing the prozona. Abdomen varying from grizzly to blackish, the posterior edges of the segments dotted with minute longitudinal spots, and some of the posterior segments marked with a central, triangular, testaceous spot, seated on the posterior border. Hind femora with the outer face generally altogether black, occasionally lighter and marked with a central, oblique, pale dash above; upper and lower faces pale testaceous, the inner side of the upper face with a pair of black bars; hind tibiae deep purplish at base (with the basal outer tubercle deep red) passing into deep red beyond the middle, the under surface clay yellow; the spines of the basal half pale, of the apical half reddish, all black tipped. Male cerci clay yellow, edged below with blackish; supraanal plate yellow mesially, blackish laterally.

Length of body, male, 23 mm., female, 24 mm.; antennae, male, 9.5 mm., female, 10.5 mm.; pronotum, male, 5.5 mm., female, 5 mm.; hind femora, male and female, 12.25 mm.

Thirteen males, 20 females. Sierra Nevada, July 17-22, Baron Osten-Sacken; Mount Shasta, northern California, at forest line, A. S. Packard; Siskiyou County, California (U.S.N.M.—Riley collection); southern Montana, C. Thomas (U.S.N.M. [No. 721]); Montana (U.S.N.M.—Riley collection); Helena, Montana (L. Bruner); Humboldt River, Nevada, August, S. W. Burrison (S. Henshaw). It is also credited by Thomas to Wind River, Wyoming; to a point 40 miles from Virginia City, Montana, at a height of 8,000 feet; and to the dividing ridge between Idaho and southern Montana.

Since describing *B. opimus*, I have been able to compare it with the types of Thomas's *Pezotettix obesus* and find they are not distinct. The species is very close to *B. pinguis*, but differs from it in its markings, particularly in its darker antennae, its much less developed median abdominal stripe and its differently colored hind tibiae, and also in the more continuous and more developed median carina on pronotum and abdomen, and the slightly differing abdominal appendages of the male. It is evidently the commonest and most widely spread of the species of Bradynotes.

6. BRADYNOTES REFERTA, new species.

(Plate VI. fig. 10.)

Body similar in form to that of *B. hispida*, but with excessively sparse and feeble pilosity. Head full, the vertex gently tumid, the interspace between the eyes twice as broad as the narrowest part of the frontal

costa, the fastigium declivent, shallowly sulcate, with elevated rounded margins, continuous with the slightly elevated margins of the upper part of the frontal costa. The latter broad, subequal, feebly broadening below, much broader than the basal joint of the antennae, feebly sulcate in the male, and sparsely punctate; eyes not very large, slightly more prominent, and anteriorly slightly less truncate in the male than in the female; antennae about as long as (female) or a little longer than (male) the head and pronotum together. Pronotum subequal, but slightly enlarging posteriorly, especially in the female, with the faintest possible indications of lateral carinae in the male, the metazona, especially in the male, fully half as long as the prozona, the sulci of the latter scarcely less distinct than the principal sulcus, and similar, cutting the median carina, which is often but not always obsolete between the sulci and sometimes over the whole prozona; exposed portion of mesonotum fully half (female) or less than half (male) as long as the metanotum. Interspace between the mesosternal lobes fully equal to the lobes themselves (male, female), the metasternal interspace half (male) or much more than half (female) as wide as the mesosternal. Fore and middle femora considerably tumid in the male; hind femora moderately stout, about two and a half times as long as the pronotum. Abdomen with a distinct median carina, a little compressed, in the male tapering from the base, scarcely enlarged apically, but considerably upturned; supraanal plate of male fully as long as its basal breadth, dorsally ridged as in *B. obesa*; no furcula; cerci slightly longer than the supraanal plate, slightly compressed but externally tumid, tapering on the basal half, the apical subequal, moderately stout, slightly down-curved and rounded at the extremity; infracereal plates produced on the inner side nearly to the extremity of the supraanal plate.

General color and markings much as in *B. obesa*, but with lighter colored antennae, and with the upper half of the lateral lobes of the pronotum very dark, generally forming a distinct broad band in marked contrast to the lower half of the same, and in the female in contrast to the somewhat lighter griseous disk of the pronotum, the band crossing the metazona as well as the prozona. There is no red coloring upon the pronotum. Hind femora and tibiae as well as abdominal appendages similar in color to *B. obesa*, but the hind femora more variable.

Length of body, male, 19 mm., female, 20.25 mm.; antennae, male, 7.5 mm., female, 7 mm.; pronotum, male, 4 mm., female, 4.1 mm.; hind femora, male, 10 mm., female, 10.25 mm.

Two males, 3 females. Soldier, Logan County, Idaho (L. Bruner); mountains near Lake Tahoe, California, Captain Wheeler's expedition of 1876.

7. BRADYNOTES SATUR, new species.

(Plate VII, fig. 1.)

Body entirely similar to *B. pinguis* in form and vestiture. Head full, the vertex scarcely (male) or considerably (female) tumid, the interspace between the eyes much greater than the narrowest part of the

frontal costa, but not nearly twice so broad, the fastigium very strongly declivent, sulcate, with prominent lateral ridges which apically diverge slightly; frontal costa broad, considerably broader than the basal joint of the antennae, not constricted above, more or less sulcate, especially in the male, fading just below the ocellus, and very feebly punctate; eyes not very large, more prominent in the male than in the female, and roundly truncate anteriorly, alike in both sexes, but only in the male as long as the infraocular portion of the genae; antennae considerably longer (male) or somewhat shorter (female) than head and pronotum together. Pronotum regularly enlarged posteriorly, a little more in the female than in the male, with no trace of lateral carinae, the prozona fully twice (male) or nearly thrice (female) as long as the metazona, its approximated sulci similar to but less distinct than the principal sulcus, and like it continuous, the median carina hardly existing except on the metazona, where it is feeble; exposed part of mesonotum about half as long as the metanotum (male, female), the posterior border of the latter slightly (male) or distinctly (female) emarginate. Interspace between mesosternal lobes considerably wider than (male) or twice as wide as (female) the lobes themselves, the metasternal interspace nearly as great. Fore and middle femora very slightly tumid in the male, the hind femora moderately slender, nearly two and a half times as long as the pronotum. Abdomen stout with a distinct but slight median carina in the male, tapering on the basal half, hardly enlarging apically but considerably upturned; supraanal plate of male small, triangularly shield-shaped, broader than long, apically angulate, with an unimportant sulcate median ridge on basal half meeting a transverse ridge, beyond which it is depressed; no furcula; cerci very short, conical, blunt, not reaching beyond the middle of the supraanal plate; infra-cercal plates large, mesially ridged, reaching as far as the supraanal plate.

Body griseo-fuscous, flecked and tinted with sordid luteo-fuscous, lighter beneath, darker above. The vertex and mesial parts of the fastigium are fuscous, the lateral ridges of the latter lighter colored, but without a trace of red. The lower half of the lateral lobes of the pronotum are as light as the under surface, and the upper half as dark as any other part of the body, so as to form a faint dark band, but the contrasts are not great; the meso- and metanota, and the posterior borders of the abdominal segments are nearly black; the antennae are sordid luteous at the base, fuscous beyond. Hind femora externally clouded and feebly twice banded obliquely with fuscous; hind tibiae very dull luteous, clouded apically with fuscous in the female, the spines black or brown tipped.

Length of body, male, 18 mm., female, 28 mm.; antennae, male, 7.25 mm., female, 8 mm.; pronotum, male, 3.25 mm., female, 4.6 mm.; hind femora, male, 8.5 mm., female, 11.5 mm.

One male, 1 female. Placer County, California, September (U.S.N.M. [No. 722].—Riley collection).

This species is remarkable for the slenderness of the fore and middle femora of the male and the brevity of the cerci, exposing so fully the infracercal plates; it has considerably longer hind legs than *B. referta*, which it most resembles in general appearance.

20. DENDROTETTIX.

(*Δένδρορον*, a tree; *τέττιξ*, a grasshopper.)

Dendrotettix RILEY, Proc. Ent. Soc. Wash., I (1888), p. 86—name only; Ins. Life, V (1893), pp. 254-255.

Body stout, compact, transversely subquadrate, thinly pilose. Head large, broad, a little prominent, with the eyes fully as wide, at least in the male, as the length of the lateral carinae of the metazona, the summit well arched, raised a little above the level of the pronotum, the fastigium rapidly descending and forming an obtuse angle with the very straight and slightly receding face; eyes rather small but very prominent in both sexes, nearly as broad as long and no longer (female) or scarcely longer (male) than the anterior infraocular portion of the genae; interspace between the eyes exceptionally broad, in the female nearly as broad as the upper aspect of the eyes; fastigium feebly convex as far as the front margin of the eyes, in front of which it is depressed; frontal costa only moderately broad, much narrower than the interspace between the eyes, obsolescent below the ocellus; owing to the breadth of the face, the lateral carinae are more than usually divergent; antennae slender, long, about half as long as the body, even in the female. Pronotum feebly subsellate, the anterior margin flaring to receive the head, and the metazona both expanding and having its dorsum raised at a slight angle with the prozona; front margin slightly convex; hind margin slightly more convex, feebly emarginate, even in the macropterous forms; disk of prozona feebly convex transversely, of metazona plane, passing with a distinct angle into the vertical lateral lobes, more distinct on metazona than on prozona, so that, at least on the metazona, there are distinct lateral carinae, besides a well-defined percurrent, median carina; prozona smooth excepting its subrugose anterior margin, subtransverse, half as long again as the punctat rugulose metazona, cut rather deeply in the middle by a straight transverse sulcus, followed at less than half the distance to the metazona by a still deeper, scarcely arcuate, percurrent sulcus, from which there runs backward, on the middle of either side, a short impressed line. Prosternal spine stout, erect, conical; meso- and metastethia together distinctly longer than broad in both sexes, rapidly narrowing behind, so that the portion posterior to the metasternal lobes is only about half the greatest width of the metastethium; interval between the mesosternal lobes in both sexes distinctly transverse, broader than the lobes themselves; metasternal lobes rather distant (male) or distant (female), at least as widely separated as the breadth of the frontal costa. Tegmina fully developed or abbreviate, their inner edges in neither

case attinent at the base, at least in the female, in macropterous forms of exceptional breadth, especially in the distal half, broadly rounded apically, in micropterous forms no longer than the pronotum, well rounded apically.¹ Fore and middle femora a little tumid in the male; hind femora not very long nor stout, subcompressed; hind tibiae with nine to eleven, usually ten, spines in the outer series; arolium of unusual size. Extremity of the male abdomen not clavate, but upturned and bluntly rounded, the lateral margins of the subgenital plate strongly ampliate at the base, the plate itself of unequal and of narrow breadth, well rounded apically; cerci short, a little torcate, apically depressed; fureula obscure; ovipositor normally exerted.

A single species occurs from Illinois to Texas, a tree-inhabiting species, living upon oaks.

DENDROTETTIX QUERCUS.

(Plate VII, fig. 2.)

Dendrotettix quercus RILEY¹, Proc. Ent. Soc. Wash., I (1888), p. 86 [undescribed].—PACKARD, Rep. U. S. Ent. Comm., V (1890), pp. 214-215 [descriptions of immature forms only].—BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 28 [name only].

Dendrotettix longipennis RILEY MS. fide BRUNER¹, Can. Ent., XXIII (1891), pp. 191-192 [undescribed].—BRUNER, Ins. Life, IV (1891), p. 20 [undescribed]; Bull. Div. Ent. U. S. Dep. Agric., XXVII (1892), p. 33 [undescribed].—RILEY¹, Ins. Life, V (1893), p. 255 [first description].—BRUNER¹, Bull. Div. Ent. U. S. Dep. Agric., XXVIII (1893), p. 14-15, fig. 4.

Dendrotettix longipennis var. *quercus* RILEY¹, Ins. Life, V (1893), p. 256 [undescribed]. [Post-oak locust, BRUNER, Bull. Div. Ent. U. S. Dep. Agric., XIII (1887), pp. 17-19.]

Body flavous and flavo-testaceous, marked with piceous. Head, excepting summit, flavous, more or less infuscated or clouded with olivaceo-fuscous, the summit brownish testaceous, with very variable blackish markings, sometimes consisting of a median posterior dash, sometimes of a pair of divergent stripes, sometimes longitudinally combed with black; there is a broad and greatly widening black stripe behind the whole eye; front of fastigium very broadly sulcate; frontal costa and whole face very sparsely punctate, the former broadly sulcate as far down as and including the ocellus; antennae flavous, sometimes a little infuscated. Pronotum flavo-testaceous above, the metazona distinctly olivaceous, the median carina heavily marked in black; upper half or rather more of the lateral lobes with a piceous band, occasionally obsolescent on the metazona, and often distinct only at its upper and lower margins, especially the former, the remainder flavous; abdomen banded with black along the sides. Tegmina lighter or darker

¹In the United States National Museum there is a single female from Texas in which the tegmina extend a little more than halfway to the tip of the abdomen and are of a very different shape, the basal third gradually and normally broadening, but beyond tapering rather rapidly, so that the rounded tip is narrower than the base; it looks like an abnormal development.

testaceous, the veins more or less flavous; wings (according to Riley; I have not seen spread specimens) "rather dark, becoming somewhat pellucid near their base, the veins dusky, especially on the apical half." Fore and middle legs flavous; hind femora luteo-testaceous, sometimes suffused with sanguineous, with two broad fuscous bands, antemedian and postmedian, the inner and lower face sanguineous, the whole geniculation black, preceded by a lemon-yellow annulus; hind tibiae black at base, beyond flavo-luteous, often, with the exception of a post-basal annulus, more or less olivaceous, the spines, excepting their anterior base, black. Subgenital plate of male wholly black; supraanal plate long triangular, with slightly convex sides, the surface transversely arched, with a pair of approximate, slight, longitudinal ridges, meeting rather abruptly beyond the middle and inclosing a shallow basal sulcus, the sides of the plate with a median, transverse, pyramidal tubercle; furcula consisting of a pair of rather distant, very slight, triangular projections, overlying the submedian ridges; cerci very short, small, rather stout, twisted a half circle, apically depressed and the tip bluntly rounded; infracereal plates of exceptional size, very broad at base, gradually narrowing and reaching the tip of the supraanal plate.

Length of body, male, 24.25 mm., female, 29 mm.; antennae, male, 14 mm., female, 13 mm.; tegmina (long-winged), male, 21 mm., female, 23.5 mm.; (short-winged), male, 5 mm., female, 6 mm.; hind femora, male, 13.5 mm., female, 13 mm.

Six males, 11 females. Missouri (U.S.N.M. [No. 723].—Riley collection; L. Bruner); De Soto, Jefferson County, Missouri, July 8, T. Pergande (U.S.N.M. [No. 723]); Washington County, Texas, June (Bruner); Dallas, Texas (U.S.N.M. [No. 723]); Manor, Travis County, Texas, July 13, E. Hill (U.S.N.M. [No. 723]). It is said by Bruner to occur also in southeastern Nebraska, southern Iowa, and Illinois.

I have retained the name *quercus* rather than *longipennis* for this species for several reasons: It was first called by this name both by Riley and Bruner; it was first described in its earlier stages under this name by Packard (copying Bruner's description, which was unaccompanied by a name); and the name is a far more fitting one than *longipennis*, considering that the insect appears both in brachypterous and macropterous forms, and that it is normally brachypterous, as the basal divergence of the tegmina shows. It may also be called a mistake (in which entomologists generally have erred, myself among them) to give any species of Orthoptera a name derived from the length or brevity of the tegmina. On the other hand, indubitably the species was first fully described from mature examples under the name *longipennis*, a name given by Riley on the assumption that it was distinct from his earlier named *quercus*. As both names were given by the same naturalist, no personal question enters, and I trust that in this settlement of the question at its first raising all will agree.

Our knowledge of the natural history of this species depends almost entirely upon what Bruner wrote in his first account of it in 1887, before it was named. He found it in destructive numbers in Washington County, Texas, feeding upon the post oak and "completely defoliating the trees of the forest even to the very topmost twigs." He gives the following account of its history and habits:

The egg pods are deposited in the ground about the bases of trees or indifferently scattered about the surface among the decaying leaves, etc., like those of all other ground-laying species. The young commence hatching about the middle of March, and continue to appear until into April. After molting the first time and becoming a little hardened they immediately climb up the trunks of the trees and bushes of all kinds and commence feeding upon the new and tender foliage. They molt at least five or six times, if we may take the variation in size and difference in the development of the rudiments of wings as a criterion. The imago or mature stage is reached by the last of May or during the first part of June.

The species is very active and shy in all its stages of growth after leaving the egg. The larva and pupa run up the trunks and along the limbs of trees with considerable speed, and in this respect differ considerably from all other species of locusts with which I am acquainted. I am informed that the mature insects are also equally wild and fly like birds. They feed both by day and night; and I am told by those who have passed through the woods after night, when all else was quiet, that the noise produced by the grinding of their jaws was not unlike the greedy feeding of swine.

The colors of the insect in life during the early stages are given in the same place by Bruner and copied by Packard.

Riley had previously reared the species in Missouri on oaks.

21. PODISMA.

(Ποδισμός, measuring by feet.)

Podisma LATREILLE, Cuvier, Règne Anim., V (1829), p. 188.

Pezotettix BURMEISTER, Germar, Zeitschr. Ent., II (1840), p. 51.

Form of body and of head as in *Melanoplus*; antennae as there, but rarely (*Podisma variegata*, e. g.) they are as long as the hind femora. Pronotum variable, but always short, sometimes subcylindrical, sometimes (and especially in the female) expanding considerably from in front backward, never mesially contracted, generally with very feeble transverse sulci, the lateral lobes obliquely truncate apically on the anterior section; front margin truncate, hind margin usually subtruncate or truncate and even emarginate, but sometimes also very obtusangulate, the prozona generally considerably longer than the metazona, sometimes twice as long, smooth or very faintly punctate, the metazona generally very densely punctate; median carina distinct, but sometimes slight on the metazona, generally feeble sometimes obsolete on the prozona; lateral carinae very variable, the disk sometimes passing quite insensibly into the lateral lobes, sometimes so abruptly and angularly as to form tolerably distinct lateral carinae. Prosternal spine always prominent, generally bluntly conical; meso- and metastethia together, at least in the male and nearly always in both sexes, distinctly longer than the width of the metastethium, the latter narrowing posteriorly, so that the

portion behind the metasternal lobes is not (or is hardly) more than half the greatest width of the metastethium and is twice as broad as long; interspace between mesosternal lobes of male distinctly transverse,¹ as broad or almost as broad as the lobes themselves; of the female distinctly or strongly transverse, often fully twice as broad as long, generally as broad as and sometimes broader than the lobes themselves; metasternal lobes of male generally distinctly distant, occasionally approximate, never attingent; of the female generally more distant, the interspace in the latter sex generally as broad as or broader than the frontal costa. Tegmina never fully developed, often wholly wanting, and when present either lateral, and then generally shorter than the short pronotum, or else attingent or overlapping, and then at most reaching the middle of the hind femora, and usually subacuminate. Hind femora moderately long and slender, the inferior genicular lobe as in *Melanoplus* and the spines of the hind tibiae generally rather fewer than in that genus, nine to eleven, by exception eight or twelve, in number in the outer series. Abdomen more or less compressed, the sides of the first segment with or (in some apterous Old World forms) without a distinct tympanum, the extremity in the male more or less clavate and recurved; subgenital plate of very variable form, often prolonged to a distinct apical conical tubercle involving the apical margin, the lateral margins basally ampliate; cerci very variable, but to a less degree than in *Melanoplus*, not infrequently styliform, of variable length; furcula usually developed, but only at most to a small degree; ovipositor of female variable, typically exserted, but sometimes exceptionally extended and at others partially withdrawn in the then obtusely terminating abdomen.

The limits between this genus and *Melanoplus* are difficult to formulate; while there is no difficulty in separating the bulk of the species in either group, there are a number which find their place almost equally well in either. I have here attempted to state anew the characters first expressed by Stål, though with such necessary modifications and expansions as a far larger series of forms entails. I can hardly hope that the conclusions I have reached will be sustained at every point, but I am confident that they must hold in the main. In doubtful cases I have endeavored to determine the affinities from the concurrent study of both sexes and not from either alone, which would have brought about other and sometimes discordant results; and I have assigned the greatest weight to the intervals between the sternal lobes.

As I have here employed a different generic term from that in current use in literature, I submit the following cogent reasons for the necessity of the change:

The generic name *Podisma* was proposed in a Gallic form (*Podisme*)

¹A single exception is known to me in the subapterous Japanese *Podisma dairisama*, where it is slightly longitudinal.

by Latreille¹ in 1825 for short-winged Acridians with a prosternal spine, without specification of species. Its next use was by the same author in 1829² in its proper Latin form, and the European species now known as *Pezotettix pedestris* and *Platyphyma giornae* referred to it. The same two species, and these only, are again referred to *Podisma* by Serville³ in 1831, and to the same as a subgenus of *Acridium* by the same writer in 1839.⁴ Burmeister,⁵ however, in 1840, refers these same species, and these only to a new genus *Pezotettix*, to which he gives as a synonym "Podisma Latreille ex parte." In Burmeister's view the other portion of Latreille's genus included such species as *Stenobothrus parallelus* and *Chrysochraon dispar*.⁶ But these latter species are excluded by Latreille's definition, and in his writings I can not find that he has ever mentioned any other species as appertaining to the genus than the two first mentioned above.

The only other authors who had at this time employed the term were Brullé⁷ in 1832, who (as quoted by Fischer) referred to it only species of *Stethophyma* and *Stenobothrus*; Heyer,⁸ who in 1835 (?) employed it for *Chrysochraon dispar*; Stephens,⁹ who in 1835 had referred *pedestris* only to it; and Costa,¹⁰ who in 1836 had referred to it four supposed new species—*appulum*, *campanum*, *calabrum*, and *communis*, the first two of which are now regarded as synonyms of *Acridium aegyptium* L., the third as probably a Pamphagus, and the last as *giornae*. In view of the limitation of the genus by Serville (if Latreille ever intended its greater extension), this action of Brullé and of Costa has no force, and hence, if the name *Pezotettix* can be retained at all, it must be by regarding one of the two original species as the type of *Pezotettix*, the other of *Podisma*.

As far as I can discover, the first author to refer the two species to distinct genera was Fieber,¹¹ who in June, 1853 referred *giornae* to his new genus *Pelecycelus*, and *pedestris* to *Podisma*. Also in 1853, but later, his introduction being dated November, H. Fischer¹² referred the former species to his new genus *Platyphyma* and the latter to *Pezotettix*. Fischer has been generally followed, but it is plain that *Platyphyma* must give way to *Pelecycelus*, which in its turn must yield precedence to *Pezotettix*, of which *giornae* becomes the type, while *pedestris* becomes the type of *Podisma*.

¹Fam. Nat., p. 415.

²Cuvier, Règne Anim., V, p. 188.

³Rev. Méth. Orth., pp. 98-99.

⁴Hist. Nat. Orth., pp. 79-681.

⁵Germar, Zeitschr. Ent., II, p. 51.

⁶Compare Handb. Ent., II, p. 650, where "Podisma Latreille ex parte" is given as the equivalent of certain unnamed divisions.

⁷Exp. Morée.

⁸Germar, Faun. Ins., fasc. 17.

⁹Illustr., Mand., VI, p. 29.

¹⁰Faun. Reg. Nap., pp. 43-48.

¹¹Lotos, III, p. 119.

¹²Orth. Eur., pp. 369,374.

The early use of the term *Podisma* previous to 1853 and after 1829 (other than given above) also sufficiently confirms the appropriateness of restoring *Podisma* for the species now generally included in *Pezotettix*; for Fischer de Waldheim¹ in 1846 used it for six species, of which the first three belong to *Pezotettix* of modern writers, the next two to *Chrysochraon*, while the last is not recognizable; von Borek in 1848² refers to it *pedestris* and *frigida*; and finally H. Fischer himself first used it in 1849³ for *frigida*. His reasons later⁴ for supplanting *Podisma* by *Pezotettix* can not be defended.

The type of *Podisma* is therefore *Gryllus pedestris* Linnaeus.

This genus is more widely extended than any other of the Melanopli, being the only one not confined to America. It is a distinctly boreal type and encircles the globe. The species are largely confined to high altitudes as well as high latitudes, a number being alpine or subalpine in their respective localities. In this country the species are known from two widely separated regions; in the west, the Rocky Mountain region from Alberta to northern New Mexico; and in the east from western Ontario and New York to Maine. In Europe they are largely confined to the mountains of southern Europe from the Pyrenees to Mount Parnassus or to Scandinavia; in Asia their distribution is less known, but species occur in eastern Siberia and in Japan.

In the following pages I have fully described only the American species, which are first treated separately; but I have thought well to complete the account of the Melanopli by including the Old World species as far as possible, figuring their abdominal appendages, giving a separate table for their determination, and adding brief diagnoses of two species which are unpublished. Their synonymy and distribution are mostly compiled from Brunner's Prodrömus Eur. Orthopteren.

ANALYTICAL KEY TO THE AMERICAN SPECIES OF PODISMA.

A. Tegmina wanting; upper valves of ovipositor elongate, straight, only faintly falciform apically; hind border of pronotum truncate or feebly emarginate.

b¹. Hind femora almost uniformly green; furcula of male extending over the supraanal plate by twice the length of the last dorsal segment; cerci relatively stout, in the middle distinctly more than half as broad as the base.

1. *glacialis* (p. 98).

b². Hind femora conspicuously fasciate with fuscous; furcula of male extending over the supraanal plate by not more than the length of the last dorsal segment; cerci very slender, in the middle distinctly less than half as broad as the base.

2. *variegata* (p. 101).

A'. Tegmina present, abbreviate; upper valves of ovipositor distinctly falciform apically.

b¹. Hind border of pronotum distinctly angulate; tegmina overlapping, generally distinctly longer than the pronotum.

c¹. Tegmina distinctly overlapping, much longer than the pronotum; male cerci short and broad, hardly if at all more than twice as long as the middle breadth; subgenital plate as seen from behind more or less broadly truncate.

¹Orth. Russ., pp. 249-253.

²15 Jahresb. Mannh. ver. nat., p. 38.

³Skand. rätv. ins. nat. hist., pp. 87-92.

⁴Orth. Eur., p. 365, note.

- d*¹. Male cerci straight as seen laterally; furcula feebly developed, no longer than the last dorsal segment from which it springs; hind tibiae uniform red. 3. *nubicola* (p. 102).
- d*². Male cerci arcuate as seen laterally; furcula well developed, crossing fully a third of the supraanal plate; hind tibiae red with a broad pale basal annulus. 4. *stupefacta* (p. 104).
- e*¹. Tegmina faintly overlapping, scarcely if any longer than the pronotum; male cerci slender, many times longer than the middle breadth; subgenital plate as seen from behind broadly conical, acute. 5. *dodgei* (p. 105).
- b*². Hind border of pronotum broadly rounded or subtruncate, not angulate; tegmina at most subattingent, generally distinctly separated, no longer or scarcely longer than the pronotum.
- c*¹. Furcula not more than a fourth as long as the supraanal plate; subgenital plate with the lateral and apical margins in the same horizontal plane; interspace between mesosternal lobes of male fully or more than half as broad again as long.
- d*¹. Cerci of male slender, many times longer than the middle breadth; hind tibiae pale red. 6. *ascensor* (p. 107).
- d*². Cerci of male broad, hardly more than twice as long as the middle breadth; hind tibiae fuscoglaucous. 7. *marshallii* (p. 108).
- e*². Furcula nearly half as long as the supraanal plate; subgenital plate apically elevated; interspace between mesosternal lobes of male less than half as broad again as long. 8. *oregonensis* (p. 110).

I. PODISMA GLACIALIS.

(Plate VII, Fig. 3.)

Pezotettix glacialis SCUDDER!, Bost. Journ. Nat. Hist., VII (1863), pp. 630-631, pl. XIV, figs. 9, 10.—SMITH, Proc. Portl. Soc. Nat. Hist., I (1868), p. 149.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 148.—SCUDDER!, Hitchc., Rep. Geol. N. H., I (1874), p. 374, pl. A, figs. 5, 10.—STÅL, Bih. K. Sv. Vet.-Akad. Handl., V, no. 9 (1878), p. 15.—GIRARD, Traité élém. d'ent., II (1879), p. 246.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.—RILEY, Stand. Nat. Hist., II (1884), p. 202.—FERNALD, Orth. N. E. (1888), p. 29; Ann. Rep. Mass. Agric. Coll., XXV (1888), p. 113.—MORSE, Psyche, VII (1894), p. 106.

Podisma glacialis WALKER, Cat. Salt. Brit. Mus., Suppl., V (1871), p. 72.

Pezotettix borealis GLOVER, Ill. N. A. Ent., Orth. (1872), pl. VI, figs. 16-18.

Dark olivaceous green above, greenish-yellow beneath in life, often in drying becoming ferruginous, clothed thinly with rather long pile. Head yellowish green with a greenish streak down the middle of the frontal costa, above dark olivaceous green; labium, maxillae, tip of labrum, and of clypeus pale bluish white, the palpi yellow with the terminal joint apically rimmed with brown, the mandibles black at tip and extreme base; vertex gently tumid, feebly elevated above the pronotum, the interspace between the eyes as broad (male) or twice as broad (female) as the first antennal joint; fastigium moderately declivent, straight, and not arcuate, in the male lying below the upper level of the eye so as to be hidden on a side view, shallowly (male) or very shallowly (female) sulcate, broadening anteriorly, especially in the male; frontal costa percurrent or almost percurrent, equal, as broad as (male) or distinctly narrower than (female) the interspace between the eyes,

sulcate throughout at least in the female and rather deeply below the ocellus, very feebly and sparsely punctate; eyes of moderate size, moderately prominent especially in the male, not at all elongate, but as long (male) or almost as long (female) as the infraocular portion of the genae; antennae yellowish brown, paler below, darkest at tip, greenish toward the base, almost as long (male) or three-fourths as long (female) as the hind femora. Pronotum subequal, faintly constricted mesially in the male, and faintly (male) or slightly (female) expanding on the metazona, dark olivaceous green, the lateral lobes bright greenish yellow below, with the principal sulcus marked in black and terminating below in a small black spot; above with a broad piceous postocular band which traverses the head and pronotum, expanding posteriorly on the metazona and continued interruptedly on the abdomen as a series of dark transverse streaks at the base of the segments; disk of pronotum strongly convex, passing insensibly into the vertical lateral lobes; median carina feeble, dull, percurrent, equal; front margin faintly convex with a minute mesial emargination; hind margin subtruncate with a broad but very feeble emargination; prozona longitudinal (male) or quadrate (female), nearly twice as long as the faintly punctate or smooth metazona. Prosternal spine short, blunt, conical; interspace between mesosternal lobes somewhat less than half as broad again as long (male) or nearly twice as broad as long, about as broad as the lobes (female), the metasternal lobes approximate (male) or almost as distant as the mesosternal (female); prosternum dusky, the spine tipped with brown, the rest of the sternum greenish yellow. Tegmina wanting. Fore and middle femora very tumid in the male, distinctly shorter than in the female; hind femora rather slender, compressed, yellowish grass green, broadly but very obscurely bifasciate with dark olivaceous green, the under surface and lower half of inner surface coral red, the geniculation black; hind tibiae green, the spines black nearly to their base, eight to eleven, usually nine to ten, in number in the outer series. Abdomen hardly (male) or distinctly (female) compressed, with a distinct though dull median carina, dark olivaceous green (female) or as described below (male), the sides of the first segments with a distinct tympanum, the extremity in the male a little clavate, much recurved, the supraanal plate triangular with acutangulate apex, the sides mesially contracted and but slightly elevated, the median sulcus distinct, deep, percurrent between rather stout walls; furcula consisting of a pair of approximate, very slender and tapering, acuminate black spines, crossing the basal fifth or less of the supraanal plate; cerci black, long, erect, externally tumid except at the dimpled apex, not strongly compressed, tapering in the basal half to two-thirds the basal breadth, beyond feebly expanding to a very slight degree, apically rounded but inferiorly angulate, the whole a little longer than the supraanal plate and straight, being neither arcuate nor incurved; subgenital plate very short and broad, broadly

conical, ending in a blunt but not large tubercle, the apical margin scarcely elevated, angulate, entire.

The colors of the above description, which are taken from life, are, unless otherwise specified, drawn entirely from the female, as the sexes differ considerably. The male differs in the following particulars: The front of the head and the pronotum are more yellowish, the prosternum black, the spine uniform pale green, the meso- and metasterna bright green, the sternum of the abdomen yellowish-green, slightly paler than the thorax, with the basal border of the segments broadly bordered with black and the apical narrowly with fuscous; the whole dorsal surface of the abdomen is black with a mediodorsal series of yellowish-green spots and a triangular spot of the same between the middle and hind coxae; a lateral row of greenish-yellow spots on the first eight abdominal segments, each with a dark arcuate streak above it, opening toward the brownish spiracles.

Length of body, male, 16 mm., female, 26 mm.; antennae, male, 8.5 mm., female, 9 mm.; hind femora, male, 9.25 mm., female, 12 mm.

Twenty-one males, 37 females. Maine (U.S.N.M. [No.724].—Riley collection); Magalloway River, Oxford County, Maine, Sanborn (Museum Comparative Zoology); Speckled Mountain, Oxford County, Maine, 2,000 feet (?), S. I. Smith, same (A. P. Morse); Mount Kearsarge, New Hampshire, 3,250 feet (A. P. Morse); Presidential Range, White Mountains, New Hampshire, 4,000 to 5,400 feet (S. H. Scudder; Museum Comparative Zoology; A. P. Morse); Greylock, Berkshire County, Massachusetts, 3,500 feet (A. P. Morse; S. H. Scudder); Mount Marcy, Adirondacks, New York, 5,400 feet, F. G. Sanborn; Chateaugay Lake, Adirondacks, New York, 2,000 feet, F. C. Bowditch; Sudbury, Ontario, Canada, about 1,000 feet.

Excepting Jackman, Maine (Harvey), the only other place from which it has been reported is "British America" (Bruner), but without further specification Professor Bruner now thinks this was a mistake. Mr. Morse tells me that he has specimens taken on Kataadn, Maine, 5,200 feet.

In the White Mountains I have found this grasshopper from the neighborhood of the snow arch in Tuckermans Ravine (about 4,000 feet) to the base of the rocky slopes on the side of Mount Washington above the Alpine Garden, and at the summit of Mount Madison (5,380 feet) at about the same elevation. I have also taken it at the upper limits of Huntingtons Ravine and about the ledge on the carriage road. It frequents the close branches of the dwarf birch, *Betula nana*, and is rarely or never seen on the ground.

Of the European insects, it is most nearly allied to *Pod. baldensis*, but is a considerably larger insect, with heavier and stouter cerci and slenderer and longer furcula.

2. *PODISMA VARIEGATA*, new species.

(Plate VII, fig. 4.)

Pezotettix glacialis COMSTOCK!, Intr. Ent., 1888, p. 107.

Pallid testaceous with an olivaceous tinge, variegated with dark glistening fuscous or chocolate brown in which also an olivaceous tinge may be detected, pilose. Head pallid olivaceo-testaceous, blotched with olivaceo-fuscous on the genae, and heavily infuscated above, with a broad postocular olivaceo-fuscous band; vertex somewhat tumid, slightly elevated above the pronotum, the interspace between the eyes a little broader than (male) or twice as broad as (female) the first antennal joint; fastigium considerably declivent, straight, and not arcuate, in the male lying below, in the female at, the upper level of the eyes so as not to be wholly seen on a side view, a little sulcate, abruptly and angularly expanded a little anteriorly; frontal costa failing to reach the clypeus, subequal, but faintly contracted at the ocellus and as faintly expanding between the antennae, as broad as (male) or slightly narrower than (female) the interspace between the eyes, sulcate excepting above, sparsely punctate above; eyes rather small, very prominent in the male, but little longer than broad, about as long as (male) or a little shorter than (female) the infraocular portion of the genae; antennae lighter or darker olivaceo-fuscous, distinctly longer in the male than the hind femora. Pronotum subequal, faintly subselliform in the male, expanding feebly posteriorly in the female, the disk dull bronze olivaceous in the female, pallid testaceous with a mediadorsal, irregular but not broad, dark chocolate fuscous stripe and dark transverse sulci in the male, the lateral lobes glistening pale testaceous below, above with a very broad, percurrent, glistening brownish fuscous band, in the female deeply tinged with olivaceous; disk strongly convex, passing insensibly into the vertical lateral lobes; median carina slight, percurrent, equal; front and hind margins truncate, the latter feebly emarginate mesially; prozona quadrate in both sexes, sparsely, feebly, and rather coarsely punctate (particularly in the male and posteriorly), twice (male) or almost twice (female) as long as the obscurely, finely, and not densely punctate metazona. Prosternal spine short, blunt, conical; interspace between mesosternal lobes a little transverse and nearly or quite as broad as the lobes (male) or twice as broad as long, fully as broad as the lobes (female), the metasternal lobes approximate (male) or distant, but much less so than the mesosternal (female). Tegmina wanting. Fore and middle femora somewhat tumid in the male and distinctly shorter than in the female, dark olivaceous; hind femora flavo-testaceous, broadly trifasciate with blackish fuscous, besides a blackish geniculation, the under surface pale or dull coral red; hind tibiae bronze green or olive green, the spines black almost from their base, ten, rarely eleven, in number in the outer series. Abdomen hardly (male) or distinctly (female) compressed, with a distinct median

carina, ferrugineo-testaceous, becoming lighter below, obscurely punctate with fuscous (female) or flavo-testaceous above, flavo-olivaceous below, the sides heavily marked with glistening blackish chocolate (male); sides of the first segment with a distinct tympanum; extremity in the male clavate, considerably recurved, the supraanal plate triangular with subrectangulate apex, the sides scarcely elevated and feebly emarginate in the middle, the median sulcus moderately deep, percurrent, subequal, and moderately broad, raised much above the general surface by the considerable elevation of its bounding walls; furcula consisting of a pair of approximate, short, tapering, black spines, hardly longer than the last dorsal segment; cerci castaneous, black-tipped, suberect, very long and very slender, tapering in the basal fourth, beyond distinctly less than half as broad as the base and subequal, feebly expanding apically solely by the curve of the upper margin, the apex inferiorly angulate, the whole a little longer than the supraanal plate and straight except for being feebly incurved; subgenital plate small, about equally broad and long, its apex a little tumid, the apical margin not elevated, well rounded, entire.

Length of body, male, 16.5 mm., female, 23.5 mm.; antennae, male, 10.5 mm., female, 8.5+ mm.; hind femora, male, 9.25 mm., female, 12.75 mm.

Two males, 1 female. Ithaca, Tomkins County, New York, about 400 feet, November, J. H. Comstock; Enfield Falls, Tompkins County, New York, about 450 feet (H. O. Woodworth). The specimens were taken in each case on the banks of streams.

Since this was written, E. M. Walker has sent me drawings of this species from specimens taken at De Grassi Point on Lake Simcoe, about 50 miles north of Toronto, Canada.

. This species differs from the preceding not only in coloring and markings, but in the greater length of the antennae and hind legs, the brevity of the furcula, and the slenderness of the cerci.

3. *PODISMA NUBICOLA*, new species.

(Plate VII, fig. 5.)

Melanoplus monticola BRUNER! MS. (pars).

Cinereo-fuscous. Head varying from testaceous to plumbeous, more or less infuscated, above blackish fuscous in a posteriorly broadening mesial stripe, a supraocular belt and a postocular band, sometimes run together; vertex tumid, considerably elevated above the pronotum, the interspace between the eyes almost (male) or fully (female) twice as broad as the first antennal joint; fastigium moderately declivent, broadly and distinctly sulcate, less deeply in the female than in the male; frontal costa feebly expanding and fading before the clypeus, faintly narrowed above, slightly (male) or distinctly (female) narrower than the interspace between the eyes, sulcate at and below the ocellus (but feebly in the female), heavily punctate throughout; eyes small, faintly promi-

ment in the male, no longer (male) or distinctly shorter (female) than the infraocular portion of the genae; antennae luteous or luteo castaneous, heavily infuscated apically, two-thirds (male) or hardly half (female) as long as the hind femora. Pronotum feebly constricted mesially, cinereo-fuscous more or less infuscated, sometimes punctate with fuscous, pilose, the lateral lobes of the prozona distinctly tumid above and piceous or blackish fuscous, the disk considerably convex, particularly on the prozona, and passing into the subvertical lateral lobes by a well-rounded shoulder, which is distinctly angulate on the metazona only, forming blunt lateral carinae; median carina percurrent, marked in black, distinct throughout but more elevated and longitudinally arched on the metazona and sometimes subobsolete between the sulci; front margin faintly convex, hind margin obtusangulate, the angle well rounded; prozona quadrate, only a little if any longer than the rather sparsely and shallowly punctate metazona. Prosternal spine short, very stout, appressed conical, very blunt; interspace between mesosternal lobes a little broader than long (male) or fully half as broad again as long but narrower than the lobes (female), the metasternal lobes subattingent (male) or about half as distant as the mesosternal lobes (female). Tegmina reaching to about the middle of the hind femora, overlapping, rapidly tapering but apically well rounded, cinereo-fuscous often with a vinous tinge, generally heavily flecked with blackish fuscous, particularly but not exclusively in the discoidal area. Fore and middle femora somewhat tumid in the male; hind femora testaceous or flavo-testaceous, on the upper half obliquely and rather broadly bifasciate with fuscous or blackish fuscous, besides a basal spot of the same and an infuscated or piceous upper genicular lobe, the inferior face flavous; hind tibiae pale red brightening apically, the spines black in their apical half, nine to eleven, usually ten, in number in the outer series. Extremity of male abdomen clavate, somewhat recurved, the supraanal plate triangular with acutangulate apex, nearly plane surface, with a moderately broad and equal median sulcus, gradually fading beyond the middle; furcula consisting of a pair of very slender tapering parallel fingers, extending over the outer sides of the submedian ridges of the supraanal plate by about the length of the last dorsal segment; cerci stout and thick, subequal, hardly tapering blades, about twice as long as broad, nearly straight but faintly arcuate, well rounded apically, very faintly twisted with a feeble sulcation or compression sometimes apparent along the upper outer margin of the apical half; subgenital plate rather small, of about equal length and breadth, the apical margin a little elevated, broadly truncate as seen from behind and entire, a feeble ridge descending from each extremity of the apical margin across the apical face.

Length of body, male, 16 mm., female, 19 mm.; antennae, male, 6.25 mm., female, 5 mm.; tegmina, male, 7.5 mm., female, 8 mm.; hind femora, male, 9.75 mm., female, 10.5 mm.

Ten males, 7 females. Mount Lincoln, Park County, Colorado, above timber, 11-13000 feet, August 13 (S. H. Scudder; L. Bruner). [U.S.N.M. No. 725, male and female.]

Bruner gave the unpublished name of *Melanoplus monticola* both to this species and to *M. monticola*, p. 290. All the specimens seen were taken by myself in 1877.

4. PODISMA STUPEFACTA.

(Plate VII, fig. 6.)

Pezotettix stupefactus SCUDDER¹, Ann. Rep. Chief Eng., 1876 (1876), p. 503; Ann. Rep. Geol. Survey 100th mer., 1876 (1876), p. 283.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.

Cinereo-fuscous. Head light brown or yellowish brown, the upper half and sometimes the whole head mottled rather heavily, on the top of the head very heavily, with brownish fuscous, often becoming blackish in a median band on the top of the head and less distinctly above the upper edges of the eyes; vertex gently tumid, slightly elevated above the pronotum, the interspace between the eyes but little broader than (male) or fully twice as broad as (female) the first antennal joint: fastigium distinctly sulcate, most deeply in the male, with distinct and nearly straight, raised, lateral margins, which pass into the lateral margins of the frontal costa; the latter distinctly punctate next the margins like the whole of the face, nearly equal but slightly narrower above, the surface plane except for a slight, short, narrow sulcation at and below the ocellus; eyes of moderate size, not very prominent, the front margin subtruncate, rather longer (male) or distinctly shorter (female) than the infraocular portion of the genae; antennae brownish yellow, becoming dusky toward the tips, in the female a little more than three-fifths as long as the hind femora. Pronotum nearly plane above, the prozona with scarcely perceptible fullness, and on either side of the median carina, at the principal sulcus, a slight oblique depression; the whole pronotum broadens a little and regularly in passing backward, the posterior margin obtusely and roundly angulate; median carina distinct though slight on the metazona, inconspicuous excepting in front on the prozona, and in the female nearly obsolete; lateral carinae distinct, though not prominent; surface profusely punctate, almost rugulose on the metazona; the color is brownish-yellow, darkest on dorsum, and profusely flecked with darker colors; upper third or half of lateral lobes with a postocular brownish fuliginous belt, confined to the prozona, narrower at the extreme front; transverse sulcations distinct, only seldom, and then but slightly, marked with black. Prosternal spine short and very stout, very blunt, and subcylindrical (male) or conical (female); interspace between mesosternal lobes a little transverse (male) or half as broad again as long but narrower than the lobes (female), the metasternal lobes approximate (female) or only a little more than half as distant as the meso-

sternal lobes (female). Tegmina fully half as long as the abdomen, elongate, subfusiform, the tip roundly pointed, dark brown, more or less variegated with yellowish and blackish, the small spots showing a tendency to a longitudinal arrangement, most of the veins light; wings a little shorter than the tegmina. Fore and middle femora rather tumid in the male; hind femora light yellowish-brown, with a pair of conspicuous, submedian, V-shaped, dark brown or blackish bands externally, crossing the upper surface transversely, the extreme base and tip marked with the same color; hind tibiae yellow, the spines black to their base, 10 in number in the outer series. Abdomen yellowish beneath, mostly reddish-brown above, deepening into black, the extremity clavate and somewhat upturned in the male, the supraanal plate hastate, strongly constricted mesially, with elevated margins and obtusangulate tip, the median sulcus narrow, deep, and extending almost to the tip; furcula consisting of a pair of large, parallel, attingent, tapering, acuminate, flattened fingers, reaching nearly halfway across the supraanal plate; cerci short, very broad, nearly equal, strongly compressed, laminate, the tip broadly rounded, slightly incurved, so that the outer margin is broadly convex, the inner shallowly concave; subgenital plate broad and short, narrowing apically, the apical margin abruptly, slightly, and almost uniformly elevated above the lateral margins and set at right angles with them, feebly notched mesially.

Length of body, male, 17 mm., female, 20.5 mm.; antennae, male, female, 7.5 mm.; tegmina, male, 7.7 mm., female, 6.75 mm.; hind femora, female, 11.5 mm.

One male, 3 females. Taos Peak, Sangre de Cristo Mountains, northern New Mexico, 13,000 feet, Lieutenant W. L. Carpenter (S. H. Scudder; U.S.N.M. [No. 726].—Riley collection); Colorado, "Alpine," August (U.S.N.M. [No. 726].—Riley collection).

5. *PODISMA DODGEI*.

(Plate VII, fig. 7.)

Caloptenus dodgei THOMAS!, Can. Ent., III (1871), p. 168; Ann. Rep. U. S. Geol. Surv. Terr., V (1872), p. 451, Pl. II, figs. 4, 5, 9.—GLOVER, Ill. N. A. Ent., Orth. (1872), Pl. XI, figs. 4, 5, 9.

Pezotettix dodgei THOMAS!, Rep. U. S. Geol. Surv. Terr., V (1873), p. 153; Proc. Dav. Acad. Sc., I (1876), p. 259.—UHLER, Bull. U. S. Geol. Surv. Terr., III (1877), p. 796.—THOMAS, Ann. Rep. Chief Eng., 1878, p. 1845 (1878).—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59; Bull. Div. Ent. U. S. Dep. Agric., IV (1884), p. 57.—RILEY, Stand. Nat. Hist., II (1884), p. 202.—COCKERELL, Can. Ent., XXII (1890), p. 76.

Pezotettix bohemani STÅL!, Bih. K. Sv. Vet.-Akad. Handl., V (1878), No. 9, p. 15.

Pezotettix marshallii SCUDDER!, Appal., I (1878), p. 263.

Pezotettix aspirans SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), pp. 85-86; Cent. Orth. (1879), pp. 74-75.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.

Vertex gently tumid, slightly elevated above the pronotum, the interspace between the eyes considerably broader than the first antennal

joint, rather broader in the female than in the male; fastigium shallowly sulcate, subequal, the bounding walls low and coarse; frontal costa subequal, expanding at the base, very slightly sulcate above, more sulcate but not deeply below the ocellus, as broad as the interspace between the eyes, sparsely, coarsely, and biserially punctate; antennae about five eighths as long as the hind femora, slightly longer in the male than in the female. Pronotum very short and stout, simple, expanding a little on the metazona; prozona quadrate (male) or transverse (female), of the same length as the metazona; front margin truncate, hind margin gently angulated, more prominently in the female than in the male; median carina distinct but dull and equal on the metazona, obsolete on the prozona; transverse sulci of the prozona unusually distinct, continuous; lateral carinae distinct but rounded; disc punctate, distantly and rather faintly on the prozona, abundantly and rather coarsely but still faintly on the metazona. Prosternal spine short, stout, appressed conical, blunt, in the female subtransverse; interspace between mesosternal lobes fully half as broad again as long (male) or nearly twice as broad as long (female), the metasternal lobes approximate (male) or distant (female). Tegmina short subfusiform, scarcely longer than the pronotum, about twice as long as broad, the extremity produced but rounded, the inner edges not or faintly overlapping. Extremity of male abdomen clavate, considerably recurved, the supraanal plate triangular, perhaps a little longer than broad, the sides straight, the tip rounded, the surface subgibbose; furcula consisting of a pair of minute, triangular, blunt, rather distant teeth; cerci simple, regularly conical, compressed at base, blunt-tipped, considerably shorter than the supraanal plate; subgenital plate sharply upturned and tumid, short-conical, several times longer than broad, the extremity just below the entire apical edge produced to a blunt point.

The general color is blackish griseous, very obscurely mottled with testaceous above, dirty yellow tinged with ferruginous below; antennae pale red at base, much infuscated beyond; a quadrate piceous patch occupies the upper part of the lateral lobes upon the prozona, followed immediately below by a paler tint, and occasionally edged on the lateral carinae with dull testaceous. Tegmina with some of the veins of the dorsal field (for the anterior field is deflected) testaceous. Hind femora testaceous, conspicuously marked with black at base and tip, and by two moderately broad transverse bands, the premedian angulate; hind tibiae pale red, marked with fuscous toward the base, the spines black, ten to twelve, usually ten, in the outer series.

Length of body, male, 14.5 mm., female, 21 mm.; antennae, male and female, 5.5 mm.; tegmina, male, 4 mm., female, 5 mm.; hind femora, male, 8 mm. female, 8.8 mm.

Thirty males, 28 females. Colorado, Morrison, 13,000 feet (S. Henshaw; S. H. Scudder); Colorado, alpine, September (U.S.N.M.—Riley collection); Pikes Peak, Colorado, 12,000 to 13,000 feet, August 24 (S.

H. Scudder; U.S.N.M. [No. 727].—Riley collection); Sierra Blanca, Colorado, 12,000 to 13,000 feet, August 29; Georgetown, Clear Creek County, Colorado, 8,500 to 9,000 feet, July 12-13; North Park, Colorado (L. Bruner); Poudre River, Colorado, June (U.S.N.M.—Riley collection); Beaver Brook, Jefferson County, Colorado, 6,000 feet, July 11; Laramie, Albany County, Wyoming (L. Bruner); Wasatch Mountains near Beaver, Utah, August 1-4, E. Palmer.

It has also been reported from the mountain sides in Clear Creek Canyon, Colorado (Uhler), from Brush Creek, Colorado, 12,000 feet (Cockerell), from Colorado (Stål), and from Montana (Bruner).

I formerly compared this insect to the European *Podisma alpina* var. *montana*, but it should rather be compared to *Podisma pedestris* on account of its much shorter subgenital plate, though in its cerei it is more nearly related to the former; it can not be confounded with either, but is more nearly related to *Podisma pedestris* than to any other American type.

By the kindness of Doctor Aurivillius, of Stockholm, I have received one of the type specimens of Stål's *Pezotettix bohemani*, and been able to compare it with the types of the other nominal species mentioned in the synonymy.

6. PODISMA ASCENSOR, new species.

(Plate VII, fig. 8.)

Pezotettix dodgei SCUDDER!, Bull. U. S. Geol. Surv. Terr., II (1876), p. 261.

Brownish testaceous above, dull testaceous below. Head testaceous, feebly olivaceous, embrowned above; vertex feebly tumid, not elevated above the pronotum, the interspace between the eyes half as broad again (male) or nearly twice as broad (female) as the first antennal joint; fastigium moderately declivent, broadly and very shallowly sulcate; frontal costa percurrent, equal, a little narrower than the interspace between the eyes, feebly sulcate at and a little below the ocellus, faintly and finely biserially punctate above; eyes of moderate size, not at all prominent, similar in the two sexes, anteriorly truncate, slightly longer, especially in the male, than the infraocular portion of the genae; antennae testaceous, apically infuscated, about two-thirds as long as the hind femora in both sexes. Pronotum feebly and regularly expanding posteriorly, with a more or less broken and irregular piceous postocular band confined to the prozona, the disk broadly convex and passing by a rounded shoulder, nowhere forming distinct lateral carinae, into the anteriorly tumid subvertical lateral lobes; median carina slight, percurrent, subequal but slighter on the prozona than on the metazona; front border truncate, hind border rotundato-obtusangulate; prozona longitudinally (male) or transversely (female) subquadrate, slightly (male) or scarcely (female) longer than the finely punctate metazona. Prosternal spine of moderate length, stout, conical, not very blunt; interspace between mesosternal lobes nearly twice as broad as long, but

narrower than the lobes in both sexes, the metasternal lobes approximate (male) or subapproximate (female). Tegmina distinctly (male) or scarcely (female) shorter than the pronotum, lateral, rather widely separated, subovate with rotundato angulate costal margin and subacuminate apex, brownish fuscous. Fore and middle femora no more tumid in the male than in the female; hind femora ferrugineo-testaceous, faintly and angularly bifasciate with fuscous, the under surface flavous, the genicular are broadly piceous; hind tibiae pale yellowish red, with a fuscous patellar spot, the spines black almost to their base, ten to eleven in number in the outer series. Extremity of male abdomen a little clavate, slightly recurved, the supraanal plate triangular with acutangulate apex, the surface strongly but broadly tectate, the median sulcus broad, moderately deep, with very rounded walls, percurrent but partially interrupted beyond the middle; furcula consisting of a pair of rather slender, tapering and acuminate, parallel, approximate fingers a little longer than the last dorsal segment, overlying the submedian ridges of the supraanal plate; cerci small, simple, substyliform, a little compressed, considerably shorter than the supraanal plate, blunt-tipped or narrowly truncate; subgenital plate small, of about equal length and breadth, the lateral and apical margins in the same plane, entire, as seen from above strongly rounded, subangulate.

Length of body, male, 17 mm., female, 18.5 mm.; antennae, male, 6 mm., female, 6.6 mm.; tegmina, male, 3.1 mm., female, 4.5 mm.; hind femora, male, 9.5 mm., female, 10 mm.

One male, 1 female. American Fork Canyon, Utah, A. S. Packard.

This species is the nearest allied of the American forms to *Podisma pedestris* of Europe, but differs distinctly from it in the structure of the subgenital plate and the slender fore and middle femora of the male.

7. *PODISMA MARSHALLII*.

(Plate VII, fig. 9.)

Pezotettix marshallii THOMAS, Rep. Geogr. Surv. 100th mer., V (1875), pp. 889-890, pl. XLV, fig. 3.—SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), p. 86; Cent. Orth. (1879), p. 75.—BRUNER, Rep. U.S. Ent. Comm., III (1883), p. 59.

Brownish fuscous above, often more or less ferruginous, sordid testaceous beneath. Head fusco- or ferrugineo-olivaceous, more or less infuscated above (the infuscation sometimes confined to a pair of widening streaks), with a broader or narrower piceous postocular band; vertex gently tumid, scarcely or not elevated above the pronotum, the interspace between the eyes twice (male) or nearly thrice (female) as broad as the first antennal joint; fastigium broad, moderately declivent, scarcely sulcate; frontal costa rather prominent, fading before the clypeus, equal, much narrower than the interspace between the eyes, plane, irregularly punctate; eyes of moderate size, slightly prominent in the male, somewhat longer than the infraocular portion of the genae; antennae dark castaneous, becoming blackish fuscous apically, nearly three-fifths (male) or hardly a half (female) as long as the hind femora.

Pronotum subequal, feebly expanding on the metazona, especially in the female, the disk of the prozona often enlivened with the lighter colors of the face, the upper half of the lateral lobes of the prozona occupied by a piceous patch or band, sometimes broken in the female, the disk convex and passing into the vertical lateral lobes by a rounded shoulder, rarely angulate, without forming lateral carinae; median carina weak, pereurrent, subequal, but slightly feebler on the prozona than on the metazona; front margin truncate, hind margin broadly rotundate, occasionally feebly angulate in the female; prozona slightly longitudinal (male) or slightly transverse (female), distinctly longer than the finely punctate metazona. Prosternal spine short and stout, scarcely tapering, very blunt, appressed; interspace between mesosternal lobes fully half as broad again as long (male) or about twice as broad as long, barely narrower than the lobes (female), the metasternal lobes approximate (male) or hardly half as distant as the mesosternal lobes (female). Tegmina about as long as the pronotum, moderately distant, elliptical, about twice as long as broad, apically subacuminate, fusco-ferruginous. Fore and middle femora considerably tumid in the male; hind femora moderately stout, testaceous often tinged with ferruginous, very obliquely bifasciate with fuscous, generally interrupted on the outer half of the upper face, the under face flavous, verging on orange, the venation more or less infuscated; hind tibiae dull greenish, a little pilose next the base, with a fuscous patellar spot, the spines black almost to their base, eight to eleven, usually nine, in number in the outer series. Extremity of male abdomen clavate, somewhat recurved, the supraanal plate long hastate with expanded base, roundly angulate sides and rectangulate apex, the lateral margins considerably elevated, the median sulcus deep and conspicuous between high and sharp walls, terminating apically in a cochlearate depression; furcula consisting of a pair of slender, tapering, acuminate, divergent fingers hardly a fifth as long as the supraanal plate; cerci rather broad, gently tapering in the basal half, beyond equal, apically rounded, nearly straight except for being gently incurved, less than three times as long as the middle breadth; subgenital plate short and very broad, the lateral and apical margins in nearly the same plane, rotundato-angulate as seen from above, entire.

Length of body, male, 19 mm., female, 20 mm.; antennae, male, 6 mm., female, 5.5 mm.; tegmina, male, 4 mm., female, 5.5 mm.; hind femora, male, 10.5 mm., female, 11.5 mm.

Ten males, eleven females. Mount Lincoln, Colorado, 11,000 to 13,000 feet, August 13 (S. H. Scudder; [U.S.N.M. No. 728]). It has also been reported from the "mountains of southern Colorado" by Thomas; and by myself, but erroneously, from Sierra Blanca, Colorado, and northern New Mexico; for in different papers I have formerly referred to this species what are here described as *Melanoplus altitudinum* and *Podisma dolgei*. The present species has a close general resemblance to *Melanoplus indigenus*, extending to the abdominal appendages of the male.

8. *PODISMA OREGONENSIS*.

(Plate VII, fig. 10.)

Pezotettix oregonensis THOMAS, Rep. Geogr. Expl. 100th mer., V (1875), pp. 888, 889.

Of rather large size for this genus, blackish fuscous more or less ferruginous, sordid testaceous below. Head sordid olivaceous, much suffused or sprinkled with fuscous, above wholly or almost wholly infuscated, with a broad piceous postocular band; vertex gently tumid, feebly elevated above the pronotum, the interspace between the eyes nearly (male) or distinctly more than (female) twice as broad as the first antennal joint; fastigium rather steeply declivent, shallowly and broadly (male) or scarcely (female) sulcate; frontal costa fading just before the clypeus, equal, slightly narrower than the interspace between the eyes, faintly depressed at the ocellus, nowhere sulcate, rather sparsely punctate throughout, biserially and more heavily above; eyes moderately large, not prominent, anteriorly subtruncate, a little (male) or scarcely (female) longer than the infraocular portion of the genae; antennae rufous, sometimes feebly infuscated apically, fully two-thirds (male) or a little more than half (female) as long as the hind femora. Pronotum subequal, slightly enlarging posteriorly on the posterior half, the sides with a broad postocular piceous band confined to the prozona, less conspicuous in the female than in the male and often broken, the disk rather broadly convex and passing into the inferiorly vertical lateral lobes by a well rounded shoulder, occasionally showing a blunt angulation; median carina distinct on the metazona, generally very feeble on the prozona and often subobsolete between the sulci; front margin truncate, hind margin very broadly convex, occasionally subangulate; prozona longitudinal (male) or quadrate (female), about a third (male) or at most a fourth (female) longer than the densely punctate metazona. Prosternal spine rather large and stout, conical or subconical, bluntly pointed; interspace between mesosternal lobes nearly (male) or fully (female) half as broad again as long, narrower than the lobes; metasternal lobes subattinent (male) or moderately approximate (female). Tegmina about as long as the pronotum, subattinent, ovate, apically bluntly acuminate, at most twice as long as broad, ferrugineo-fuscous. Fore and middle femora considerably tumid in the male; hind femora rather long, not very slender, testaceous, more or less but generally much and confusedly infuscated, not infrequently distinctly and obliquely bifasciate with fuscous, the lower face and lower half of inner face flavous, the geniculation more or less infuscated; hind tibiae sordid pale olivaceous, with a fuscous patellar annulus, the spines black nearly from the base, eleven to twelve, rarely ten, in number in the outer series. Extremity of male abdomen considerably clavate, much recurved, the supraanal plate subtriangular with rectangulate apex, the lateral margins strongly elevated in the basal half, the median sulcus moderately deep, fading beyond the middle of the plate, bounded by rather broad

walls; furcula consisting of a pair of parallel or feebly divergent, flattened, slender, tapering, bluntly acuminate fingers nearly half as long as the supraanal plate; cerci subequal compressed laminae, a little more than twice as long as broad, nearly straight but feebly arcuate and feebly incurved, not so long as the supraanal plate, well rounded apically, sometimes feebly dimpled apically on the exterior surface; subgenital plate of equal length and breadth, broadly subconical, the apical margin slightly elevated and sububerculate.

Length of body, male, 17 mm., female, 24 mm.; antennae, male, 6.75 mm., female, 6.25 mm.; tegmina, male, 4.75 mm., female, 5 mm.; hind femora, male, 10 mm., female, 11.75 mm.

Fourteen males, 21 females. Idaho (U.S.N.M.—Riley collection); Henry Lake, Idaho, August (same; L. Bruner); Yellowstone, Montana (U.S.N.M.—Riley collection); Fort McLeod, Alberta, August (same; L. Bruner.) It was originally described by Thomas from Oregon.

Thomas's text refers to an illustration on a plate, but another species was there substituted for it. His types do not appear to exist, but I think there can be little doubt that this is his species, his description agreeing exceptionally well and certainly applying to no other insect I have seen. I am also drawn to this conclusion by notes taken many years ago upon examination of his types.

ANALYTICAL KEY TO THE OLD WORLD SPECIES OF PODISMA.

A¹. Subgenital plate of male normal, as seen from above at least as long as broad, apically narrowing (Podisma, s. s.).

b¹. Tegmina absent.

c¹. Sides of first abdominal segment with no distinct tympanum.

d¹. Disk of pronotum smooth, at least on prozona.

e¹. Hind tibiae red; lobes of male furcula very distant; cerci very short, styliform, acuminate; subgenital plate not prolonged beyond its apical margin 9. *pedemontana* (p. 112).

e². Hind tibiae lutescent; lobes of male furcula attingent; cerci moderately long, subcompressed, slightly dilated apically; subgenital plate prolonged as a tubercle beyond its apical margin 10. *cobellii* (p. 113).

d². Disk of pronotum rugulose throughout.

e¹. Hind femora pallid beneath; hind tibiae rufescent... 11. *costae* (p. 113).

e². Hind femora red or reddish beneath; hind tibiae sordid blue.

f¹. Pronotum of female enlarging but little posteriorly; lobes of male furcula stout though small, rounded; subgenital plate as broad as long, the apical margin broadly rounded, with a feeble, indistinct, and blunt tubercle 12. *parnassica* (p. 113).

f². Pronotum of female enlarging posteriorly rapidly and considerably; lobes of male furcula slight and minute, elongate; subgenital plate much longer than broad, the apical margin angulate, with a small but distinct and slightly elevated tubercle 13. *pyrenaea* (p. 114).

c². Sides of first abdominal segment with a distinct tympanum.

d¹. Hind tibiae flavo-olivaceous; lateral halves of last dorsal segment of male widely separated; cerci tapering almost regularly throughout, equal for a short distance beyond the middle; subgenital plate elongate, its apical margin subangulate as seen from above 14. *salamandra* (p. 114).

- d*². Hind tibiae reddish; lateral halves of last dorsal segment of male narrowly separated; cerci enlarging slightly beyond the middle; subgenital plate short, its apical margin broadly rounded as seen from above. 15. *baldensis* (p. 114).
- b*². Tegmina present, abbreviate; sides of first abdominal segment with a distinct tympanum.
- c*¹. Interspace between mesosternal lobes of male quadrate or faintly longer than broad; abdomen of male not clavate, the cerci bent abruptly inward at right angles beyond the middle, the furcula obsolete. . . . 16. *dairisama* (p. 114).
- c*². Interspace between mesosternal lobes of male broader, generally much broader than long; abdomen of male distinctly clavate, the cerci gently incurved throughout or straight, the furcula more or less though feebly developed.
- d*¹. Eyes of male very prominent; posterior margin of pronotum truncate; tegmina linear or sublinear, lateral; cerci of male decurved or apically enlarged, as well as incurved.
- e*¹. Hind margin of pronotum distinctly emarginate; interspace between mesosternal lobes of male twice as broad as long; hind tibiae greenish; furcula of male composed of a pair of attingent projecting black points; cerci regularly tapering, acuminate, incurved, and decurved; ovipositor of female elongate and slender, the upper valves straight. 17. *schmidtii* (p. 115).
- e*². Hind margin of pronotum feebly emarginate; interspace between mesosternal lobes of male only a little broader than long; hind tibiae yellow; furcula of male composed of a pair of scarcely projecting distant lobules; cerci at first tapering, then enlarging feebly, apically well rounded; ovipositor of female rather short and stout, the upper valves normally falcate. 18. *feberi* (p. 115).
- d*². Eyes of male only moderately prominent; posterior margin of pronotum rounded or obtusangulate; tegmina broad elliptical or simply abbreviate; cerci of male simple, tapering throughout, straight or merely incurved.
- e*¹. Pronotum with the transverse sulci deeply impressed, the hind margin rounded; hind tibiae blue or partly flavescens; subgenital plate of male greatly produced, extending beyond the tip of the supraanal plate by fully the length of the latter, and narrowly acutangulate as seen from above; cerci regularly compressed-conical.
- f*¹. Hind tibiae cyaneous; cerci of male short and moderately stout, shorter than the hind arolia; tip of subgenital plate bluntly rounded. 19. *pedestris* (p. 116).
- f*². Hind tibiae sordid violaceous at base, apically flavescens; cerci of male moderately long, slender, longer than the hind arolia; tip of subgenital plate acuminate. 20. *alpina* (p. 116).
- e*². Pronotum with the transverse sulci slightly impressed, the hind margin obtusangulate; hind tibiae red; subgenital plate of male little produced, extending beyond the supraanal plate by much less than the length of the latter, strongly rounded as seen from above; cerci laminate, subequal, bluntly rounded at tip. 21. *frigida* (p. 117).
- A*². Subgenital plate of male, as seen from above, much broader than long, apically broadened, the lateral walls excessively tumid (*Eupodisma*) . . . 22. *primnoa* (p. 117.)

9. PODISMA PEDEMONTANA.

(Plate VIII, fig. 1.)

Pezotettix pedemontanus BRUNNER, Prodr. Eur. Orth. (1882), p. 230.

For a figure of the abdominal appendages of this species, which I have not seen, I am indebted to Herr Josef Redtenbacher through Hofrath Brunner von Wattenwyl.

Susa, Piedmont, Italy.

10. *PODISMA COBELLII*.

(Plate VIII, fig. 2.)

Pezotettix cobellii KRAUSS, Verh. Zool.-Bot. Ges. Wien, XXXIII (1883), pp. 222, 223, fig. 2.*Pezotettix salamandra* COBELLI, Ort. Gen. Trent. (1883), p. 15.

Hofrath Brunner von Wattenwyl has kindly loaned me a pair of this little known species for study and illustration.

Mountains about Roveredo, Tyrol:—Cima Posta, Monte Pasubio, 6,000 to 7,000 feet, and somewhat lower; Sette Albi.

11. *PODISMA COSTAE*.*Pezotettix costae* TARGIONI TOZETTI, Bull. Soc. Ent. Ital., XIII (1881), p. 185.—BRUNNER, Prodr. Eur. Orth. (1882), p. 229.

I have not seen this species, and introduce it in the table only by aid of the characters assigned by Brunner.

Monte Morrone, Abruzzo, Italy.

12. *PODISMA PARNASSICA*, new species.

(Plate VIII, fig. 3.)

Pezotettix parnassicus BRUNNER!, MS.

Very dark bronze green, beneath dull testaceous (male), or ferrugineo-testaceous, beneath dull flavous (female), the lower margins of the lateral lobes of the color of the under surface, the abdomen with a slender dorsal testaceous stripe. Antennae as long as the head and pronotum together. Frontal costa scarcely depressed at the ocellus, fading before the clypeus. Pronotum short, subcylindrical (male) or feebly expanding posteriorly (female), pretty uniformly and sparsely rugoso-punctate, slightly more finely on the metazona than on the prozona; prozona transverse, nearly twice as long as the metazona, its transverse sulci inconspicuous; posterior margin of pronotum truncate, the median carina subobsolete, lateral carinae wanting. Meso- and metanota, especially in the male, and the dorsum of the basal abdominal segments, in the male only, punctate. Prosternal spine blunt conical; interspace between mesosternal lobes quadrate (male) or strongly transverse, fully as broad as the lobes (female), the metasternal lobes subattinent (male) or distant, the interspace broader than the frontal costa (female). Tegmina wanting. Hind femora olivaceo-testaceous, rufous beneath in the female; hind tibiae lutescent (male) or pale green (female), the spines black-tipped, eight to nine in number in the outer series. Sides of first abdominal segment with no tympanum; extremity of male abdomen not clavate nor recurved, the supraanal plate triangular with a median sulcus in the basal half and a broad depression apically; furcula consisting of a pair of rather distant, hardly elongate, rounded lobes no longer than the last dorsal segment; cerci

small, styliform, shorter than the supraanal plate; subgenital plate small, slightly longer than broad, the apical margin thickened and sub-tuberculate.

Length of body, male, 15 mm., female, 21 mm.; antennae, male, 5.5 mm., female, 7.5 mm.; pronotum, male, 3 mm., female, 4.4 mm.; hind femora, male, 7.25 mm., female, 10 mm.

One male, 1 female. Mount Parnassus, Greece; through the kind communication of Hofrath Brunner von Wattenwyl.

13. PODISMA PYRENAEA.

(Plate VIII, fig. 4.)

Pezotettix pyrenaea FISCHER, Orth. Eur. (1853), p. 373, pl. xv, figs. 22*, 22* a.

Pezotettix pyrenaicus BRUNNER, Prodr. Eur. Orth. (1882), p. 229.

For an opportunity of studying this species I am indebted to M. de Bormans.

Pic du Midi, Pyrenees, France, 9,540 feet.

14. PODISMA SALAMANDRA.

(Plate VIII, fig. 5.)

Pezotettix salamandra FISCHER, Orth. Eur. (1853), pp. 372-373, pl. xv, fig. 22, 22 a b c.—BRUNNER, Prodr. Eur. Orth. (1882), pp. 228-229.

In the mountainous region north and east of the Adriatic, Goritz and Adelsberg, Illyria, the Draga Thal near Fiume, Istria and Josephs-thal, Croatia. It is found on bushes like our *P. glacialis*.

15. PODISMA BALDENSIS.

(Plate VIII, fig. 6.)

Pezotettix baldensis KRAUSS, Verh. Zool.-Bot. Ges. Wien, XXX (1883), pp. 220-222, fig. 1.

Pezotettix salamandra GRABER, *ibid.*, XVII (1867), p. 271.

For an opportunity of examining and figuring this species I am indebted to Hofrath Brunner von Wattenwyl.

Monte Baldo, southern Tyrol, 5,000 feet.

16. PODISMA DAURISAMA, new species.

(Plate VIII, fig. 7.)

Dark olive green, beneath dull flavous. Frontal costa deeply sulcate, subpercurrent, equal. Pronotum subcylindrical, the hind margin subtruncate, minutely emarginate; prozona quadrate, finely and sparsely punctate; metazona rather densely punctate, hardly more than half as long as the prozona; median carina obsolete, lateral carinae wholly wanting; transverse sulci of prozona feebly impressed; lateral lobes concolorous with disk. Prosternal spine conical, subacute; interspace between mesosternal lobes faintly longitudinal (male) or transverse,

almost as broad as the lobes (female), the inner margins of the lobes strongly rounded, the metasternal lobes subattingent (male) or distant by nearly the breadth of the frontal costa (female). Tegmina lateral, elliptical, more than twice as long as broad, no longer than the prozona, ferrugineo-testaceous. Hind femora fusco-olivaceous, sanguineous beneath; hind tibiae feebly valgate, green, the spines black-tipped, nine to ten in number in the outer series. Abdomen lighter in the male than in the female, in the former with a pair of subdorsal, longitudinal, oval, basal, flavous spots on segments three to eight, sides of first segment with a distinct tympanum, the extremity hardly clavate or recurved in the male, the supraanal plate blunt triangular, tectate, with broad, regularly narrowing, percurrent median sulcus; furcula wanting, the lateral halves of the last dorsal segment rather distant; cerci moderately slender, rather regularly tapering, blunt-tipped, abruptly bent inward and upward beyond the middle; subgenital plate equally broad and long, conical, ending in a blunt tubercle prolonged beyond the apical margin. Valves of ovipositor rather long, nearly straight, the upper pair sinuate above, with serratulate margins.

Length of body, male, 24 mm., female, 31.5 mm.; antennae, male, 8 mm.; pronotum, male, 5.5 mm., female, 6.5 mm.; tegmina, male, 3 mm., female, 4 mm.; hind femora, male, 11 mm., female, 14 mm.

One male, 1 female. Japan (U.S.N.M. [No. 729], through L. Bruner).

17. *PODISMA SCHMIDTII*.

(Plate VIII, fig. 9.)

Podisma schmidtii FIEBER, Lotos, III (June, 1853), pp. 119-120.

Pezotettix mendax FISCHER, Orth. Eur. (Nov., 1853), pp. 371-372, pl. xv, figs. 23, 23 ab.—BRUNNER, Prodr. Eur. Orth. (1882), pp. 227-228.

The publication of Fieber's species dates from 1853 (Lotos) and not from 1854 (Synopsis), and antedates by several months the description of Fischer, whose name has been hitherto accepted; for Fieber's species was published in the June number of Lotos, and the preface to Fischer's work is dated November.

This species occurs, according to Brunner von Wattenwyl, on hazel stalks and bramble bushes.

Austrian Alps, especially the southern side, from Transylvania westward to southern Tyrol and the Swiss canton Ticino; and in the mountainous region bordering the upper extremity of the Adriatic, eastward.

18. *PODISMA FIEBERI*, new name.

(Plate VIII, fig. 8.)

Pezotettix schmidtii BRUNNER, Verh. Zool.-Bot. Ges. Wien, XI (1861), p. 306, pl. xvi, figs. 23 A B; Prodr. Eur. Orth. (1882), p. 225.

As Brunner points out, this is not the *Podisma schmidtii* of Fieber (1853); but he nevertheless retains Fieber's name for it, because it was first described by himself under that name, under the supposition that

it was Fieber's species, and because Fieber's *schmidtii* and Fischer's *mendax* are the same. By the ordinary rules of nomenclature, the name *schmidtii*, having been applied to one species of the genus could not subsequently be applied to another, even if the first were a synonym; but it is doubly incorrect here, since *schmidtii* of Fieber has the priority over *mendax* of Fischer. It is therefore necessary to give the present species a new name.

This species is found on leafy bushes.

From Carniola eastward to Servia, southern Hungary, and Transylvania.

19. PODISMA PEDESTRIS.

(Plate VIII, fig. 10.)

Gryllus pedestris LINNÆUS, Syst. Nat., Ed. X (1758), p. 433.

Aerydium pedestre OLIVIER, Encycl. Méth., VI (1791), p. 232.

Podisma pedestris LATREILLE, Chev. Règne Anim., V (1829), p. 188.

Pezotettix pedestris BURMEISTER, Germ. Zeitschr. Ent., II (1840), p. 51.—

FISCHER, Orth. Eur. (1851), pp. 369-371, pl. xv, figs. 17, 17⁺, 18, 18a.—

BRUNNER, Prodr. Eur. Orth. (1882), pp. 226-227.

Aerydium apterum DEGEER, Mém., III (1773), p. 474, pl. XXIII, figs. 8, 9.

In northern Europe, in Finland, southern Sweden, and Holstein; then again farther south in the high alps of Switzerland, at the Wengern alp and the Rhone glacier, and in the mountains of southern Bavaria and the Tyrol; farther east it comes down to the hill country and occurs from Carinthia eastward to the Volga. South of the alps it is found in southeastern France, southern Tyrol, and Sardinia. It has been incorrectly reported from England.

20. PODISMA ALPINA.

(Plate IX, fig. 1.)

Gryllus alpinus KOLLAR, Beitr. Landesk. Oesterr., III (1833), p. 83.

Podisma alpina FIEBER, Lotos, III (1853), pp. 119.

Pezotettix alpina FISCHER, Orth. Eur. (1853), pp. 368-369, pl. xv, figs. 19, 20.

Pezotettix alpinus BRUNNER, Prodr. Eur. Orth. (1882), pp. 224-225, pl. VII, fig. 53.

Aeridium pulchellum HERRICH-SCHAEFFER, Nomencl. Ins., II (1810), Orth., 8, 19.

Podisma frigidum FISCHER, Jahresb. Mann. ver. Naturk., XV (1849), pp. 38-39.

Podisma subalpinum FISCHER, *ibid.*, XVI (1850), p. 27.

Occurs in two forms: *alpina*, with tegmina separate and lateral, found in the higher mountains; and a larger, *collina*, with tegmina overlapping, half as long as the abdomen.

P. a. alpina occurs in all the higher mountains of central Europe as far east as the borders of Servia. I found it extremely abundant in the alpine pastures about Villars sur Bex, Canton de Vaud, Switzerland. *P. a. collina* is found from Carniola and the forest of Vienna through southern Hungary to Transylvania.

21. *PODISMA FRIGIDA*.

(Plate IX, fig. 2.)

Gryllus frigidus BOHEMAN, Övers. K. Sv. Vet.-Akad. Forh. (1846), p. 80.*Podisma frigidum* VON BORCK, Skand. Rätv. Ins. Nat. Hist. (1818), pp. 90-92, pl. III, fig. 2.*Pezotettix frigida* FISCHER, Orth. Eur. (1853), pp. 366-368, pl. xv, fig. 21.*Pezotettix (Melanoplus) frigidus* STÅL, Rec. Orth., I (1873), p. 79.*Pezotettix frigidus* BRUNNER, Prodr. Eur. Orth. (1882), pp. 223-224.*Pezotettix alpicola* FISCHER, Stett. Ent. Zeit., XIII (1852), p. 21.

Occurs in Lapland and Norway; and again in the high alps of Switzerland and the Tyrol.

22. *PODISMA (EUPODISMA) PRIMNOA*.

(Plate IX, fig. 3.)

Podisma primnoa FISCHER DE WALDHEIM, Orth. Russ. (1846), p. 248.*Primnoa viridis* MOTSCHULSKY, MS., *ibid.*

On account of the extraordinary development of the subgenital plate of the male of this largest of *Podismae*, I have proposed for it the subgeneric name of *Eupodisma*.

Fischer de Waldheim describes it from Verkhni-Udinsk, Transbaicalia, Siberia. Specimens in my collection were collected by Parschine at the same place in June, at Samonoffsk in June, at Khabarowki and Tscherbhjava on the Amur in May and August, and in the Desert of K' inskaya in Transbaicalia.

22. *PARATYLOTROPIDIA*.(*Παρά*, beside; *Tylotropidia*, a genus of *Euprepocnemes*.)*Paratylotropidia* BRUNNER, Rév. Syst. Orth. (1893), p. 147.

Body moderately stout, somewhat compressed, without noticeable pilosity, the excessively brief and fine hairs being exceedingly scattered. Head large by being protuberant, not broader than the pronotum, the face moderately oblique and the genae feebly tumescent; vertex broadly arched, not elevated above the pronotum; fastigium very broad, tumid, feebly declivent, anteriorly rounded; eyes rather long oval, fully half as long again as broad, especially in the female, anteriorly subtruncate, separated above by an exceptionally wide interval, almost or quite twice as wide as the rather broad frontal costa; antennae slender, about as long (in the female at least) as the head and pronotum together. Pronotum long, compressed, subequal, narrowed above anteriorly, the disk nearly plane but the prozona slightly tumid, with percurrent and equal median carina, distinct, percurrent, equal and feebly arcuate lateral carinae, the transverse sulci feebly incised, the hind margin produced, but very obtusangulate, the metazona flaring only in the female and then almost imperceptibly. Prosternal spine

not stout, conico-cylindrical; meso- and metastethia together much longer than broad in both sexes, the latter narrowing rapidly behind, so that the portion behind the lobes, more than twice as broad as long, is scarcely more than half as broad as the metastethium; interspace between mesosternal lobes much longer than broad in both sexes and much narrower than the lobes themselves, the metasternal lobes more (male) or less (female) approximate, the interspace in the female scarcely so broad as, in the male much narrower than, the frontal costa. Tegmina abbreviate, overlapping, acuminate. Hind femora very long, the inferior genicular lobe subpallid, uniform, the hind tibiae with eight to twelve spines in the outer series. Sides of the first abdominal segment with a distinct tympanum. Subgenital plate of male with no apical tubercle, its lateral margins ampliate, basally rectangulate; cerci lamellate, subpyriform, tapering strongly and unequally, the apex produced, subacuminate and incurved. Abdomen of female regularly tapering, the ovipositor normally exerted, the valves nearly straight with acute but smooth costae.

The genus is represented by a single species found in the western Mississippi valley. When published by Brunner, no species was described or even named, but the species here given is the one upon which the genus was founded and is therefore the type.

PARATYLOTROPIDIA BRUNNERI, new species.

(Plate IX, figs. 4, 5.)

Warm brownish ferruginous, approaching castaneous, inclining to flavous below, marked with pale flavous. Head protuberant, flavous, faintly and sparsely punctate with fuscous, above with an anteriorly tapering, broad, ferrugineo-fuscous or olivaceo-fuscous band, the genae behind the eyes more or less distinctly infuscated; vertex feebly tumid, not elevated above the pronotum, the interspace between the eyes exceptionally broad, being nearly four times as broad as the basal joint of the antennae; fastigium very feebly declivent, plane or tumid, scarcely expanding anteriorly, its lateral margins not in the least elevated, well rounded, its anterior margin well rounded as seen from above; frontal costa fading just before the clypeus, faintly enlarging from above downward, above about (male) or fully (female) half as wide as the interspace between the eyes, feebly sulcate at the ocellus, coarsely and sparsely punctate throughout; eyes not very large nor prominent, about as long as the infraocular portion of the genae; antennae luteo-testaceous, apically infuscated, in the female about two-thirds as long as the hind femora. Pronotum elongate, compressed, subequal but feebly enlarging backward on the upper portion of the anterior section of the prozona, beyond it equal, the disk very broadly subteetate, passing by abrupt angles, forming distinct and continuous feebly and oppositely arcuate lateral carinae facing inward, into the vertical lateral lobes, which above are very steeply and convexly declivent; whole

pronotum unicolorous except that the lower portions of the lateral lobes become gradually flavescens and the lateral carinae are conspicuously flavous; median carina percurrent, equal, blunt, longitudinally arcuate on the prozona: front margin subtruncate, hind margin very obtusangulate, both delicately margined; prozona very longitudinal, being more than (male) or almost (female) half as long again as broad, very coarsely and sparsely punctate, half as long again as the finely ruguloso-punctate metazona. Prosternal spine rather long, conico-cylindrical, erect, blunt; interspace between mesosternal lobes twice as long as broad (male) or fully half as long again as broad (female), the metasternal lobes approximate (male) or moderately distant (female). Tegmina subovate, very broad, very rapidly tapering especially by the oblique excision of the costal margin and the strong apical arcuation of the inner margin, subacuminate, a little longer than the pronotum, overlapping, brownish castaneous, the ulnar vein broadly marked with pale flavous edged anteriorly with blackish fuscous. Fore and middle femora somewhat enlarged in the male, rufo-flavous; hind femora flavo-testaceous, the outer face and the geniculation more or less deeply infuscated especially above, without fasciation or maculation of any kind; hind tibiae rather deep red or fusco-violaceous, the spines pallid with black tips, eight to eleven in number in the outer series. Extremity of male abdomen clavate but very feebly enlarged, very strongly recurved, the supraanal plate pretty regularly triangular, as long as broad, the apex acutangulate, the margins feebly and broadly elevated, the median sulcus not very deep, terminating with its bordering ridges in the center of the plate; furcula ?; cerci very broad and somewhat tumid at base, forming a compressed and slightly tortuous cone, tapering rapidly and somewhat regularly, but with the slender tip a little produced, curved slightly inward and downward, bluntly pointed, reaching the tip of the supraanal plate; infracercal plates very broad, suddenly narrowing just beyond the base but easily visible outside the cerci nearly the whole length of the latter, slightly produced apically to attain the tip of the supraanal plate; subgenital plate tumid, very broad at apex, partly by the retrocession of the preceding ventral segment, distinctly broader than long, the lateral and apical margins together feebly arcuate so that the apex is slightly elevated, the apical margin as seen from above acutangulate, entire.

Length of body, male, 29.5 mm., female, 39.5 mm.; antennae, female, 12.5 mm.; pronotum, male, 7.5 mm., female, 9.75 mm.; fore femora, male, 9 mm., female, 11.15 mm.; hind femora, male, 16 mm., female, 18.5 mm.

One male, 1 female. Dakota (L. Bruner); Dallas, Texas, Boll (U.S.N.M. [No. 730.]—Riley collection).

The single male (from Dakota) is slightly mutilated, preventing a description of certain parts. I was at first inclined to regard this as distinct from Bruner's species, of which he favored me with a description and figure (hitherto unpublished), on account of the representation

of the lateral carinae of the pronotum in his figure as arcuate in an opposite sense to that here described; but his description agrees so perfectly with the other characteristics of the specimens before me that I regard this as an accident. Nevertheless, I append hereto the description furnished by him, with the sketch sent me, which he kindly permits me to publish (see Plate IX, fig. 5).

PARATYLOTROPIDIA sp.

Colore castaneo. Pronotum disco deplanato, carina media percurrente, necnon utrinque carina longitudinali flava delineato. Elytra abbreviata, acuminata, fascia flava secundum venam ulnarem ornata. Femora postica carina superiore acuta instructa, superne flava. Tibiae posticae fusco-violaceae, spinulis albis, apice nigris, in utroque margine numero 10 ad 12. Lamina supraanalis ♂ triangularis, acuminata, plana. Cerci ♂ deplanata, basi latissimi, apice acuminati. Lamina subgenitalis ♂ elongata, ultra apicem laminae supraanalis valde prominula. Ovipositor valvulis aente costatis sed haud denticulatis.

	♂	♀
	mm.	mm.
Long. corp.	30	38
pron.	8	10
elytr.	9	12
fem. post.	16.5	20

Patria: Dallas, Texas.

Brunner, 1895.

23. MELANOPLUS.

(Μέλαις, black; ὄπλα, armor.)

Melanoplus STÅL, Rec. Orth., I (1873), p. 79.

Body moderately stout, rarely slender, generally feebly compressed, more or less but generally feebly pilose. Head moderately, rarely not at all, prominent, generally but little if any longer than the prozona, unless the latter (as rarely) is distinctly transverse; face almost vertical or a little oblique, its angle with the fastigium rarely less than 75°; vertex gently tumid; eyes rounded oval, never more generally less than half as long again as broad, the anterior margin subtruncate or feebly convex, separated above rather or very narrowly, at most but little farther apart than the width of the equal or subequal frontal costa; fastigium more or less sometimes very declivent, passing insensibly into the frontal costa, always more or less sulcate or with elevated lateral margins, generally more deeply sulcate in the male than in the female; frontal costa moderately prominent, generally sulcate below, usually more or less punctate; antennae slender, of variable length, but never very short, never longer than the hind femora, and rarely if ever more than twice as long as the pronotum, even when this is subtruncate posteriorly. Pronotum generally subcompressed, rarely or never twice as long as the average breadth, generally only half as long again as the average breadth even in the male, the metazona generally more or less flaring, its disk plane and densely punctate, while that of the prozona

is more or less, generally slightly, convex, is rarely at all flaring in front or only in the very slightest degree, at most faintly punctate and generally distinctly longer than the metazona; front margin generally truncate or subtruncate, hind margin obtusangulate to a greater or less degree, rarely subtruncate; median carina always distinct on the metazona, generally much less so on the prozona, often subobsolete between the sulci and never wholly wanting; lateral carinae typically obsolete, but often indicated by a distinctly abrupt though rounded shoulder, rarely becoming carinate; lateral lobes vertical or subvertical, especially below, often feebly tumid above on the prozona, and generally marked by a piceous postocular band, crossing either the prozona alone or the whole pronotum, not infrequently broken or maculate. Proster-
nal spine variable, but always prominent; meso- and metastethia together distinctly longer than broad in both sexes; interspace between mesosternal lobes generally longer or much longer than broad, never¹ in the least broader than long, even when the sides of the interspace are very divergent posteriorly (male) or generally quadrate but more variable than in the other sex, sometimes as narrow as there but more frequently subtransverse, occasionally in brachypterous forms distinctly transverse, as a general rule wider than in the other sex (female), in both always distinctly, generally much, narrower than the lobes themselves, except in the few instances² where it is distinctly transverse in the female; metasternal lobes generally attingent or subattingent, rarely only approximate (male), or generally approximate or subapproximate, the interspace between them generally narrower than the frontal costa (female); metasternum rapidly narrowing posteriorly, so that the portion behind the lobes is not, or is hardly more than, half the greatest width of the metasternum, but is more than twice as broad as long. Tegmina always present, but either abbreviate and then lateral, attingent, or overlapping, sometimes shorter and sometimes longer than, but generally nearly the length of, the pronotum and usually more or less acuminate apically; or they are fully developed and then usually about attain or a little surpass the tips of the hind femora, tapering more or less but very gradually and apically well rounded, at a distance from the apex equal to the breadth of the tegmina distinctly narrower than the metazona, the intercalaries and cross-veins of the discoidal area (except in the macropterous forms of the dimorphic species, *M. dawsoni* and *M. marginatus*) relatively numerous at least in the apical fourth and usually throughout, the venation in general sharp and clearly defined, the humeral vein straight and only apically arcuate, nearly always terminating either on the apical margin or only a short distance before it, running for some distance almost exactly parallel to the costal margin or merging insensibly into it, the

¹In two species, *M. montanus* and *M. borealis*, it is feebly transverse, but much narrower than the lobes, and is similar in the two sexes.

²These are *M. artemisiae*, *M. militaris*, and *M. altitudinum*.

area intercalata always, even in macropterous forms of dimorphic species, extending somewhat, generally considerably, beyond the middle of the tegmina. Hind femora moderately long and slender, the inferior genicular lobe with at least a darker basal spot or transverse band, the hind tibiae with a variable number of spines (generally nine to fourteen) in the outer series, by rare exception eight only. Abdomen more or less compressed, the sides of the first segment with a distinct tympanum, the extremity in the male more or less sometimes strongly clavate, usually considerably recurved, the subgenital plate of variable form, but always with the lateral margins ampliate at the base and with no distinct apical tubercle, though not infrequently apically produced or subtuberculate and frequently tumescent; cerci exceedingly variable in form, often enlarging apically, always lamellate excepting (the lakinus series—three species) where they are basally globose, never styloform, rarely (the puer series—two species) in the least substyloform, generally incurved and of about the length of the supraanal plate; furcula usually developed and to a very variable extent, and with variable form; pallium rarely exerted; ovipositor of female generally fully exerted.

The type of the genus is *Aceridium femur-rubrum* De Geer.

The number of species of *Melanoplus* is so exceedingly great that I have endeavored to display their relationships in part by separating them into groups. Noticing how seldom the characteristic parts of the male abdomen agreed in the short-winged and long-winged forms, notwithstanding that one would look for their close agreement, I have first divided them in the following table into those which are fully equipped with ample organs of flight and those in which these organs are more or less undeveloped, and then have subdivided each according to other characteristics, endeavoring thus to bring into close contiguity those which appeared to be most nearly allied. I was not a little surprised to find in how few instances it was possible to combine the brachypterous and macropterous species in any one of these groups. Even in most of these, and especially in the *dawsoni* series (itself somewhat heterogeneous on either side), the collocation is rather forced. The groups into which I have divided the macropterous forms are far more natural than those of the brachypterous species, and the portion of the table relating to the former is therefore much more satisfactory than the other. I have more than once completely remodeled that relating to the brachypterous species, but with no greater success than in that now presented.

Much to my surprise, I find but a couple of species in this genus (*M. dawsoni*, *M. marginatus*) in which there is complete dimorphism shown in the full development on the one hand and extreme abbreviation on the other of the organs of flight. In other species, especially in *M. fasciatus* and *M. extremus*, there is considerable variability, but nowhere else is it carried to this extreme. It is, however, found in *Dendrotettix*,

Phoetaliotes, and *Oedaleonotus*, each of which is represented by a single species. I have treated this matter more fully in the Introduction.

The present genus, so richly endowed with species, is naturally very widely distributed, though so far as known it is completely confined to the continent of North America, and even does not occur, so far as reported,¹ south of Mexico. Within this region it is as widespread as all the other genera combined. It extends from the arctic circle in Alaska and on the Mackenzie River, and from northern Labrador and perhaps southern Greenland on the north, to the extremity of Florida and southern Mexico on the south, and from the Atlantic to the Pacific. It is, however, far richer in species in the west than in the east. Only seventeen of the one hundred and thirty-one species are found exclusively east of the Mississippi River, though four other eastern species barely cross it; while in the Rocky Mountain region and west of it, and there only, forty-nine species are known, while thirty-two others are found only west of the Mississippi River and seven western species barely cross it to the east; six species, as stated in our introduction, range from Atlantic to Pacific; one occurs only north of our national boundaries in Labrador, while nineteen others inhabit Canada; twelve are found only in Mexico, with ten others which it possesses in common with the United States.

These figures show the western preponderance of the species better than any summary of the twenty-eight groups into which I have divided the genus, which, besides being rather unequal in the number of contained species, often show an extremely wide distribution or more than one center of distribution, in the latter case indicating, perhaps, the imperfection of the grouping. Still leaving out the five groups, each of which contains one or more trancontinental species, it will be noted that there are three others which compass the continent—the *maucus* (five species), *plebejus* (five species), and *robustus* (five species) series. Of the twenty remaining, one-half, viz, the *flabellifer* (six species), *bowditchi* (six species), *glaucipes* (two species), *utahensis* (three species), *devastator* (eight species), *aridus* (three species), *rusticus* (seven species), *borekii* (six species), *cinereus* (six species), and *packardii* (five species) series—extend westward to the Pacific; while only five—the *impudicus* (one species), *dawsoni* (seven species), *puer* (two species), *inornatus* (three species), and *punctulatus* (two species) series—reach eastward to the Atlantic coast; and the remaining five—the *lakinus* (three species), *indigenus* (one species), *alleni* (two species), *angustipennis* (four species), and *texasus* (five species) series—are found exclusively, or almost exclusively, west of the Mississippi River.

One-half of the series are represented in Mexico, showing rather

¹One species, *M. borealis*, is reported, *in litt.*, by Brunner to occur at Valdivia, Chile; as its only other known localities are in the arctic regions, I am inclined to doubt the correctness of the determination, and presume the material to be insufficient.

exceptional diversity for its twenty-two species, while ten series are represented in the twenty species hitherto found in Canada. Nearly all the series have a large latitudinal distribution, the most limited in this respect being:—in the north, the *utahensis* series (three species), from Washington and Alberta to Utah and Colorado, and the *indigenus* series (one species), confined to Idaho; and in the south the *lakinus* series (three species), from Nebraska to central Mexico, the *impudicus* series (one species), found only in Georgia and Mississippi, the *aridus* series (three species), from Arizona to Jalisco, the *puer* series (two species), found in Texas and Florida, and the *inornatus* series (three species), occurring in Illinois, Indiana, North Carolina, and northern Mexico.

ANALYTICAL KEY TO THE SPECIES OF MELANOPLUS.¹

A¹. Tegmina conspicuously shorter than the abdomen, often no longer than pronotum; furcula almost always developed feebly, generally no longer than the last dorsal segment from which it arises.

b¹. Cerci of male expanding from the base outward and bullate, abruptly tapering and bent inward at tip; subgenital plate of male abruptly elevated apically (1. *Lakinus* series).

c¹. Interval between mesosternal lobes of male nearly twice as long as broad;² of female fully half as broad again as long 1. *marculentus* (p. 139).

c². Interval between mesosternal lobes of male distinctly less than twice as long as broad; of female barely broader or not broader than long.

d¹. Hind femora heavily bifasciate above and on the outer face; hind tibiae blue throughout 2. *lakinus* (p. 141).

d². Hind femora with feeble signs of bifasciation above only, if at all; hind tibiae pale red, apically infuscated 3. *sonorae* (p. 143).

b². Cerci of male tapering in the basal half, usually from the very base, sometimes throughout, usually laminate; subgenital plate of male of variable elevation apically.

c¹. Cerci of male beyond the middle either equal or tapering, sometimes simply styliform throughout, the tip usually more or less pointed but sometimes broad or truncate; metasternal lobes of male attingent or subattingent.³

d¹. Cerci of male very broad and short, not more than twice as long as the middle breadth, and broadly rounded at apex (2. *Flabellifer* series).

e¹. Tegmina about half as long as the abdomen and much longer than pronotum; cerci of male not longitudinally sulcate apically.

f¹. Interval between mesosternal lobes of male twice as broad posteriorly as anteriorly, the inner margins of the lobes regularly divergent; interval in female longer than broad; cerci of male but little longer than broad.

7. *discolor* (p. 149).

f². Interval between mesosternal lobes of male of nearly equal breadth in front and behind, the inner margins of the lobes convex; interval in female transverse; cerci of male nearly twice as long as broad.

8. *simplex* (p. 150).

¹By permission of the Assistant Secretary, this key has been issued in advance in the Proceedings of the American Philosophical Society, XXXVI, No. 154.

²This interval is of various shapes in different species,—cuneiform, clepsydral, or rectangular, but for the purposes of this table the middle breadth is always taken.

³The cerci are faintly enlarged apically in *M. meridionalis* and *M. calshii*, which come under this division. See also the note under the alternate category.

- e*². Tegmina shorter than the pronotum; cerci of male deeply sulcate longitudinally at apex and incurved 9. *rileyanus* (p. 151).
- d*². Cerci of male more elongate, at least twice, generally much more than twice, as long as middle breadth, ordinarily more or less acuminate at apex.
- e*¹. Cerci of male irregularly tapering or scarcely tapering at all, compressed, in no sense styliform.

*f*¹. Subgenital plate of male short and broad, its apical breadth equal to or surpassing the length of its lateral margin.¹

*g*¹. Cerci of male long and very slender, in the middle not one-half the width of the frontal costa; last dorsal segment of male with a pair of strongly oblique submedian sulci outside the furecula;² subgenital plate not elevated apically (3. *Aridus* series).

*h*¹. Hind margin of pronotum truncate-emarginate; disk of metazona fully twice as broad as long; tegmina relatively slender, widely distant.

*i*¹. Disk of prozona coarsely and uniformly punctate; cerci of male apically enlarged and inferiorly acuminate at apex.

37. *humphreysii* (p. 206).

*i*². Disk of prozona coarsely punctate only along anterior margin; cerci of male apically equal, rounded at tip... 38. *nitidus* (p. 207).

*h*². Hind margin of pronotum obtusangulate but subtruncate; disk of metazona less than twice as broad as long; tegmina relatively broad, approximate, at least in the male..... 39. *aridus* (p. 209).

*g*². Cerci of male long and broad throughout, subequal, broader than the frontal costa; last dorsal segment of male with no oblique sulci outside the furecula; subgenital plate apically elevated (10. *Indigenes* series).

40. *indigenus* (p. 211).

*g*³. Cerci of male short or not very long, and broad or moderately slender, in the middle nearly as broad as if not broader than the frontal costa; last dorsal segment of male with no oblique sulci outside the furecula; subgenital plate not elevated apically (11. *Manens* series).

*h*¹. Prozona, at least in male, much longer than broad, the disk of the whole pronotum more than twice as long as the middle breadth, the median carina percurrent, equal; interval between mesosternal lobes of male twice as long as broad..... 41. *scudleri* (p. 212).

*h*². Prozona, even in male, transverse, subquadrate or slightly longitudinal, the disk of the whole pronotum less than twice as long as middle breadth, the median carina often subobsolete between the sulci; interval between the mesosternal lobes of male not more than half as long again as broad.

i. Cerci of male rather stout, subequal.

*j*¹. Abdomen of male strongly recurved; forks of furecula divergent, distinctly longer than the last dorsal segment; subgenital plate with no apical tubercle..... 42. *gillettei* (p. 215).

*j*². Abdomen of male scarcely recurved; forks of furecula parallel, minute, hardly as long as the last dorsal segment; subgenital plate with a slight apical tubercle..... 43. *artemisiac* (p. 217).

¹Care should be taken not to include in the apical breadth any part of the membranous integument connecting it with the preceding ventral segment. For simplicity's sake, the length of the plate is here considered its extent parallel to the lateral margin (or that margin itself) as seen from the side; its breadth, what would be its length along the ventral line were it regarded as one of the abdominal segments.

²This has not been seen, but is only inferred, in *M. humphreysii*.

- v*. Cerci rather slender, especially on apical half, of unequal width.
- j*¹. Tegmina shorter than the pronotum, broadly rounded or subangulate at apex; cerci long and rather slender, nearly straight as seen laterally..... 44. *maucus* (p. 218).
- j*². Tegmina as long as or longer than the pronotum, apically acuminate; cerci short and not very slender, rather strongly bent-arcuate as seen laterally..... 45. *canceri* (p. 219).
- f*² Subgenital plate of male distinctly narrower than long, often narrowing apically.
- g*¹. Cerci of male tapering but little, generally rather stout, or if slender then tapering almost not at all in apical half, which is never less than half as broad as the base and is blunt-tipped, rarely, as in *M. jurencus*, angulate below.
- h*¹. Interval between mesosternal lobes of male at least half as long again as broad, sometimes fully twice as long; hind tibiae usually blue or green (12. Dawsoni series).
- i*¹. Cerci of male apically turned sharply inward at right angles or even less..... 46. *reflexus* (p. 221).
- i*². Cerci of male straight or gently incurved, sometimes curved more strongly at apex but not bent abruptly at right angles.
- j*¹. Lateral margins of subgenital plate of male, as seen from above, regularly convergent nearly to the tip; furcula developed only as slightly swollen lobes..... 47. *meridionalis* (p. 223).
- j*². Lateral margins of subgenital plate of male, as seen from above, basally subparallel, apically rather broadly rounded; furcula developed as a pair of projecting spines or fingers.
- k*¹. Tegmina much shorter than the pronotum, widely separated; interval between mesosternal lobes of female distinctly transverse, as broad as the lobes; subgenital plate of male with distinct though minute apical tubercle..... 48. *militaris* (p. 224).
- k*². Tegmina longer than the pronotum, overlapping; interval between mesosternal lobes of female quadrate; subgenital plate of male with minute apical tubercle or none.
- l*¹. Subgenital plate of male not pyramidal, nor elevated apically except by a minute apical tubercle; furcula minute, overlying the supraanal plate by a less distance than the length of the last dorsal segment; cerci bent roundly inward at the apex..... 49. *nigrescens* (p. 225).
- l*². Subgenital plate of male subpyramidal, broadly and roundly elevated at apex; furcula well developed, reaching middle of the supraanal plate; cerci very feebly incurved apically..... 50. *dawsoni* (p. 227).
- h*². Interval between mesosternal lobes of male subquadrate, often gradually widening posteriorly; hind tibiae usually red (13. Rusticus series).
- l*¹. Apical margin of subgenital plate of male more or less elevated or tuberculate or both, generally well rounded as seen from above, never transverse.
- j*¹. Tegmina attingent or overlapping; cerci of male apically rounded; furcula distinctly developed; subgenital plate relatively long, subequal in breadth.
- k*¹. Interspace between the eyes of male broader than the first antennal joint; cerci of male with arcuate upper margin; subgenital plate apically elevated to a greater or less degree, but never conspicuously.

- l*¹. Prosternal spine transverse, apically truncate or subtruncate; interval between mesosternal lobes of female slightly transverse; subgenital plate of male moderately narrow.
53. *montanus* (p. 232).
- l*². Prosternal spine subconical, bluntly pointed; interval between mesosternal lobes of female broadly transverse, sometimes as broad as the lobes.
- m*¹. Interval between mesosternal lobes of female narrower than the lobes; cerci of male subequal throughout.
- m*¹. Prozona but little longer than the metazona; hind tibiae uniform in color beyond the patellar spot; tegmina transversely convex, so that the dorsal and lateral fields are not distinguished from each other by any angle; costal margin of same regularly arcuate.
54. *washingtonianus* (p. 233).
- n*². Prozona much longer than the metazona; hind tibiae with a broad pallid subbasal annulation; dorsal and lateral fields of tegmina set in distinct planes; costal margin of same angulato-arcuate..... 55. *walshii* (p. 235).
- m*². Interval between mesosternal lobes of female fully as broad as the lobes; cerci of male scarcely half as broad in the apical half as at base..... 56. *altitudinum* (p. 236).
- k*². Interspace between the eyes of male no broader than the first antennal joint; anal cerci of male with nearly straight upper margin; subgenital plate not apically elevated, though furnished with a backward directed tubercle formed by the angulation of the margin 57. *gravilipes* (p. 238).
- j*². Tegmina lateral, widely separated; cerci of male apically truncate; furcula obsolescent; subgenital plate relatively short, of unequal breadth..... 58. *geniculatus* (p. 239).
- i*². Apical margin of subgenital plate of male neither elevated nor tuberculate, the margins as seen from above quadrate, apically transverse..... 59. *rusticus* (p. 240).
- g*². Cerci of male tapering distinctly and abruptly, the apical less or almost less, generally very much less, than half as broad as the basal portion and more or less acuminate (14. *Borekii* series).
- h*¹. Subgenital plate of male more or less elevated posteriorly, but with no distinct apical tubercle.
- i*¹. Posterior margin of pronotum not mesially emarginate; tegmina attingent or approximate.
- j*¹. Interval between mesosternal lobes of female strongly transverse; lateral carinae of pronotum rounded so as to be subobsolete; postocular piceous band generally distinct, complete, percurrent 60. *pacificus* (p. 241).
- j*². Interval between mesosternal lobes of female subquadrate or feebly transverse; lateral carinae of pronotum distinct; postocular piceous band generally obsolete or wholly wanting, and even when distinct wholly confined to the prozona. . 61. *borekii* (p. 243).
- f*². Posterior margin of pronotum mesially emarginate; tegmina distant, lateral.
- j*¹. Color testaceous with feeble or no postocular dark belt.
62. *tennipennis* (p. 244).
- j*². Color dark fuscous with distinct and broad postocular band, at least in the male 63. *missionum* (p. 246).
- h*². Subgenital plate of male distinctly tuberculate at tip.

i¹. Tegmina more or less widely separated, rarely attingent; interval between mesosternal¹ lobes of male twice or nearly twice as long again as broad; cerci not finely acuminate at tip.

64. *fuscipes* (p. 247).

i². Tegmina attingent; interval between mesosternal lobes of male only slightly longer than broad; cerci tapering, rather regular, sub-falcate, finely acuminate at tip..... 65. *scitulus* (p. 149).

e². Cerci of male feebly compressed, substyliform, tapering almost uniformly throughout, apically acuminate (15. Puer series).

f¹. Tegmina attingent; subgenital plate of male short and broad, its apical breadth surpassing the length of its lateral margin, not elevated apically.

66. *flabellatus* (p. 251).

f². Tegmina distant; subgenital plate of male distinctly narrower than long, elevated apically..... 67. *puer* (p. 252).

e². Cerci of male more or less expanded apically, so as to be broader at some point beyond the middle than at the middle, spatulate or subspatulate; metasternal lobes of male separated by a variable interval.¹

d¹. Interval between mesosternal lobes of male quadrate or subquadrate, rarely (*M. amplexens*) half as long again as broad; metasternal lobes of male of variable width.

e¹. Subgenital plate of male distinctly narrower than long, often narrowing apically.

f¹. Lateral margins of subgenital plate of male apically meeting more or less acutely and furnished here with a conical erect tubercle (16. Inornatus series).

g¹. Interval between mesosternal lobes of female slightly longer than broad; anal cerci of male broadly expanded apically; apical tubercle of subgenital plate of male blunt..... 68. *inornatus* (p. 251).

g². Interval between mesosternal lobes of female distinctly transverse; anal cerci of male very feebly expanded apically; apical tubercle of subgenital plate acute.

h¹. Hind femora fasciate; apical half of male cerci moderately broad, the narrowest part more than half as broad as the base; lobes of furcula short..... 69. *viridipes* (p. 255).

h². Hind femora not fasciate; apical half of male cerci very slender, the narrowest part not more than a third as broad as the base; lobes of furcula long..... 70. *decorus* (p. 257).

f². Lateral margins of subgenital plate of male meeting with a rounded curve, which if apically elevated does not form a conical tubercle (17. Fasciatus series).

g¹. Cerci of male strongly incurved and conspicuously enlarged apically.

h¹. Cerci of male very slender, in the middle not one-third as broad as at base, the apical lobe feebly bifid; furcula developed as slender spines about a fourth the length of the supraanal plate.

71. *attenuatus* (p. 259).

h². Cerci of male stout, in the middle more than half as broad as at base, the apical lobe single; furcula developed as mere denticulations.

72. *amplexens* (p. 260).

g². Cerci of male at most gently if at all incurved, and feebly if at all enlarged apically.

h¹. Metasternal lobes of male subattingent; tegmina shorter than the pronotum; anal cerci of male straight as seen laterally or slightly incurved apically.

¹The cerci are barely enlarged apically in *M. viridipes*, which comes under this division. See, also, the note under the alternate category.

²The female of *M. decorus* is not known.

i. Cerci of male rounded at tip; furcula scarcely protruding beyond the hind margin of the last dorsal segment; apical margin of the subgenital plate slightly elevated above the lateral margins.

*j*¹. Supraanal plate of male suddenly contracted before the tip; anal cerci regularly incurved throughout; subgenital plate very broad at base..... 73. *saltator* (p. 261).

*j*². Supraanal plate of male regularly triangular; anal cerci slightly twisted as well as incurved; subgenital plate narrow at base.

74. *rotundipennis* (p. 263).

*i*². Cerci of male truncate at tip; lobes of furcula long; apical margin of subgenital plate in no way elevated above the lateral margins.

75. *obovatifennis* (p. 264).

*h*². Metasternal lobes of male only approximate; tegmina as long as or much longer than the pronotum; anal cerci of male slightly decurved apically, or at least inferiorly angulate at apex.

*i*¹. Tegmina not much longer than the pronotum; cerci of male delicate, tapering considerably in apical half; subgenital plate only slightly elevated posteriorly, no broader there than at base.

76. *juvencus* (p. 266).

*i*². Tegmina more than half as long as the abdomen; cerci of male coarse and stout, tapering but little in basal half; subgenital plate strongly elevated posteriorly and there very broad.

77. *fasciatus* (p. 267).

*e*². Subgenital plate of male short and broad, its apical breadth equal to or surpassing the length of its lateral margin,—see previous note (18. *Alleni* series).

*f*¹. Tegmina twice as long as pronotum; cerci of male relatively long and narrow; male cerci fully three times as long as broad. . . 79. *alleni* (p. 273).

*f*². Tegmina of about the length of the pronotum; cerci of male broad and relatively short; male cerci not more than twice as long as broad.

80. *snowii* (p. 274).

*d*². Interval between mesosternal lobes of male nearly or quite twice, sometimes more than twice, as long as broad; metasternal lobes of male attinent or subattinent.

*e*¹. Subgenital plate of male short and broad, its apical breadth equal to or surpassing the length of its lateral margin,—see previous note (23. *Texanus* series).

*f*¹. Tegmina widely separated, lateral; interval between mesosternal lobes of male more than twice as long as broad; furcula consisting of a pair of exceptionally broad and short plates 101. *dumicola* (p. 318).

*f*². Tegmina subattinent, attinent, or overlapping; interval between mesosternal lobes of male less, generally much less, than twice as long as broad; furcula consisting of a pair of approximate pointed denticulations.

*g*¹. Subgenital plate of male ending in a conical tubercle.

102. *variabilis* (p. 319).

*g*². Subgenital plate of male with no pointed tubercle.

*h*¹. Lobes of furcula longer than broad; extremity of subgenital plate of male elevated, but not noticeably recurved; interval between mesosternal lobes of male hardly more than half as long again as broad.

*i*¹. Apex of male cerci angulate below 103. *lepidus* (p. 321).

*i*². Apex of male cerci equally rounded above and below.

104. *blatchleyi* (p. 322).

*h*². Lobes of furecula broader than long; extremity of subgenital plate of male elevated and considerably recurved; interval between mesosternal lobes of male nearly or quite twice as long as broad.

105. *texanus* (p. 324).

*e*². Subgenital plate of male distinctly narrower than long, often narrowing apically (24. *Plebejus* series).

*f*¹. Hind margin of pronotum distinctly though obtusely angulate; interval between mesosternal lobes of female at least half as long again as broad; apical portion of anal cerci of male distinctly and sharply sulcate exteriorly..... 106. *plebejus* (p. 326).

*f*². Hind margin of pronotum rarely angulate, sometimes emarginate; interval between mesosternal lobes of female (where known) subquadrate; apical portion of anal cerci of male exteriorly tumid or plane.

*g*¹. Posterior margin of pronotum distinctly emarginate in the middle; tegmina widely separated; cerci of male elongate, surpassing the supraanal plate; subgenital plate broader at base than apically, its apical margin regularly rounded and even 107. *gracilis* (p. 327).

*g*². Posterior margin of pronotum obtusely angulated or rounded truncate, with at most but feeblest sign of any emargination; tegmina attinent or overlapping; cerci of male relatively brief, not surpassing the supraanal plate; subgenital plate not broader at base than apically, its apical margin angulate or tuberculate.

*h*¹. Tegmina shorter than pronotum; posterior margin of pronotum rounded truncate with feeblest signs of mesial emargination; cerci of male curved slightly upward; subgenital plate ending in a blunt rather coarse tubercle..... 108. *inops* (p. 329).

*h*². Tegmina longer than pronotum; posterior margin of pronotum distinctly though very obtusely angulate; cerci of male curved feebly downward; subgenital plate ending in a delicate pointed tubercle.

109. *marginatus* (p. 330).

*A*². Tegmina nearly or quite as long as, or longer than, the abdomen; furecula usually well developed, generally at least a quarter as long as the supraanal plate, but sometimes obsolete.

*b*¹. Cerci of male rapidly expanding from the base toward the middle, as a whole broad and short, flabellate, rarely twice as long as broad, not expanded apically (2. *Flabellifer* series).

*c*¹. Cerci of male twice as broad in broadest as in narrowest portion.

*d*¹. Subgenital plate of male with a distinct though minute independent¹ apical tubercle..... 4. *occidentalis* (p. 145).

*d*². Subgenital plate of male with only an obscure trace of apical tubercle.

5. *cuneatus* (p. 147).

*c*². Cerci of male with no striking inequality in breadth... 6. *flabellifer* (p. 148).

*b*². Cerci of male tapering from the very base toward the middle, rarely equal in basal portion,² generally long and slender and rarely as little as twice as long as broad.

*c*³. Cerci of male beyond the middle either equal or tapering, the tip usually slender or acuminate, never bifurcate (in *M. ater* it enlarges feebly).

*d*³. Furecula of male developed as large flattened lobes, about half as long as the supraanal plate and exceptionally broad, but apically narrowed by the considerable excision of their inner side; subgenital plate not elevated apically above the lateral margins (3. *Bowditchi* series).

¹ That is, not formed by the culmination of the more or less pyramidal form of the subgenital plate.

² In rare instances it expands slightly from the extreme base, but it is then greatly expanded apically.

*e*¹. Body, tegmina, and legs almost wholly green, the hind femora not banded.

*f*¹. Sides of the disk of the prozona with a distinct narrow yellow stripe, extending to the upper margin of the eyes; passage of the disk of the pronotum into the lateral lobes more gradual than in the alternate category; hind tibiae green; antennae apically infuscated.... 10. *herbaceus* (p. 153).

*f*². Disk of pronotum and summit of head uniform in coloration, the former passing into the lateral lobes with a more distinct angle than in the alternate category; hind tibiae blue; antennae uniform.

11. *flavescens* (p. 155).

*e*². Body, tegmina, and legs brown or testaceous, the hind femora generally banded with dark colors.

*f*¹. Forks of the male furcula more or less obliquely or transversely truncate at tip and given an oppositely hooked appearance by the rounded excision of the inner margin; hind femora generally distinctly banded.

*g*¹. Highly variegated, the lateral lobes of pronotum conspicuously marked with an unequal bright flavous stripe next the lateral carinae; male cerci very feebly expanded and externally sulcate apically.

12. *pictus* (p. 156).

*g*². Rather uniform in coloring, the lateral lobes with no bright stripe; male cerci in no way expanded apically and externally tumid rather than sulcate.

*h*¹. Lateral lobes of prozona with a broad and usually distinct piceous band above; tegmina generally distinctly flecked along the middle line..... 13. *bowditchi* (p. 157).

*h*². Lateral lobes of prozona with a narrow or no distinct band above; tegmina very obscurely flecked, if at all, along the middle line.

14. *flavidus* (p. 158).

*f*². Forks of the male furcula rounded symmetrically at tip, the inner margin scarcely more excised than the outer, so that the forks are straight and not oppositely hooked; bands of hind femora scarcely perceptible.

15. *elongatus* (p. 160).

*d*². Furcula of male variously developed, rarely at all unusually broad and flattened, and then either not apically emarginate on the inner side, or the subgenital plate is considerably elevated apically, or both.

*e*¹. Subgenital plate of male almost or quite as broad as the marginal length, its apical margin generally notched; cerci broad and nearly equally broad throughout (except sometimes narrowed by the oblique excision of the lower side of the apical half), the basal half scarcely tapering, the whole rarely more than twice and never thrice as long as the middle breadth (except in a few cases, and then the apical margin of the subgenital plate is mesially notched), very broadly rounded at apex.

*f*¹. Apical margin of subgenital plate of male not mesially notched; mesosternum of male variable.

*g*¹. Apical margin of subgenital plate of male but slightly elevated above the lateral margins and moderately prolonged posteriorly; mesosternum of male in front of lobes flat (4. *Glaucipes* series).

*h*¹. Prozona of male longer than its posterior breadth; lateral carinae more pronounced on prozona than on metazona; interval between mesosternal lobes of male twice as long as broad; hind tibiae blue.

16. *glaucipes* (p. 161).

*h*². Prozona of male transverse; lateral carinae more pronounced on metazona than on prozona; interval between mesosternal lobes of male subquadrate; hind tibiae red 17. *kennicottii* (p. 163).

*g*². Apical margin of subgenital plate of male conspicuously elevated above the lateral margins and greatly prolonged posteriorly; mesoster-

num of male in front of lobes with a central swelling, forming a blunt tubercle (5. *Utahensis* series).

*h*¹. Apical margin of subgenital plate of male entire;¹ lobes of furcula not exceptionally broad; subgenital plate greatly but not excessively prolonged

*i*¹. Interval between mesosternal lobes of male more than twice as long as broad; of female a little longer than broad; male cerci more than twice as long as broad; apical margin of subgenital plate of male, as seen from behind, subtruncate..... 18. *bruneri* (p. 164).

*i*². Interval between mesosternal lobes of male much less than twice as long as broad; of female transverse; male cerci less than twice as long as broad; apical margin of subgenital plate of male, as seen from behind, rounded..... 19. *excelsus* (p. 166).

*h*². Apical margin of subgenital plate of male deeply notched on either side of the middle; lobes of furcula exceptionally broad, subequal throughout; subgenital plate excessively prolonged.

20. *utahensis* (p. 167).

*f*². Apical margin of subgenital plate of male mesially notched; mesosternum of male in front of lobes with a central swelling, forming a blunt tubercle (6. *Spretus* series).

*g*¹. Tegmina extending beyond hind femora, if at all, by not more than the length of the pronotum, generally by much less than that; prozona of male quadrate or very feebly transverse; cerci of male generally almost or quite twice as long as broad.

*h*¹. Cerci of male regularly subfalcatiform, both margins being uniformly and distinctly curved rather than bent, and more than twice as long as median breadth..... 21. *alaskanus* (p. 169).

*h*². Cerci of male nearly straight as viewed laterally, or slightly bent upward in apical half, rather than curved.

*i*¹. Cerci of male distinctly more than twice as long as median breadth, the apical half subequal but narrower than the basal half.

*j*¹. Hind tibiae normally pale glaucous; when red, pale red.

*k*¹. Larger, robust; median carina usually as distinct between the sulci as on the anterior portion of the prozona.

22. *affinis* (p. 171).

*k*². Smaller, slender; median carina usually obsolete or subobsolete between the sulci..... 23. *intermedius* (p. 172).

*j*². Hind tibiae bright red..... 24. *bilituratus* (p. 174).

*i*². Cerci of male not more than twice as long as median breadth, the apical half not only narrower than the basal half, but itself tapering throughout, obliquely truncate beneath; hind tibiae usually red.

*j*¹. Tegmina brief, not nearly reaching the tips of the hind femora; apical margin of subgenital plate of male greatly elevated.

25. *defectus* (p. 177).

*j*². Tegmina reaching, generally considerably surpassing, the tips of the hind femora; apical margin of subgenital plate of male moderately elevated..... 26. *atlanis* (p. 178).

*g*². Tegmina extending beyond hind femora by the length of the pronotum or nearly as much, often by the length of the head and pronotum combined; prozona of male generally strongly transverse; cerci of male not more than half as long again as broad..... 27. *spretus* (p. 184).

¹ It is occasionally fissured mesially (perhaps in drying) but not properly notched or bilobed.

c. Breadth of subgenital plate of male variable, but generally narrower than long, its apical margin usually entire; cerci rarely less than four times as long as middle breadth (when less, at least three times as long, and then the apical margin of the subgenital plate is entire), generally slender, excepting sometimes at extreme base when there is great disparity in width between the basal and apical halves, the basal half generally tapering considerably, the apical half often much narrower than the basal, rarely showing any excision of the lower margin, the apex narrowly rounded or bluntly pointed.

f. Subgenital plate of male as broad or nearly as broad at apex as at base, generally elevated apically and often notched (generally narrowly); cerci usually narrowing but little on basal half, the apical half equal and symmetrical, bluntly rounded (rarely truncate or angulate) apically.

*g*¹. Apical margin of subgenital plate of male notched with greater or less distinctness; cerci slender, narrower than the frontal costa, subequal, straight or only gently incurved (7. *Devastator* series).

*h*¹. Small species, with tegmina not surpassing the hind femora in either sex; interval between mesosternal lobes of male distinctly less than twice as broad as long.

*i*¹. Cerci of male narrowed rather than broadened apically.

*j*¹. External surface of male cerci apically dimpled; furcula with the tapering portion relatively broad, distinctly flattened, almost reaching the middle of the supraanal plate.

*k*¹. Prozona of male longitudinal; fingers of furcula parallel; cerci bent inward apically..... 28. *diminutus* (p. 190).

*k*². Prozona of male quadrate; fingers of furcula divergent; cerci gently incurved throughout.... 29. *consanguineus* (p. 192).

*j*². External surface of male cerci sulcate through apical third or more; furcula with the tapering portion very slender, not flattened, not nearly reaching the middle of the supraanal plate.

30. *sierranus* (p. 193).

*i*². Cerci of male feebly enlarged apically rather than narrowed.

31. *ater* (p. 194).

*h*². Medium-sized species, with tegmina almost always surpassing the hind femora in the male and usually in both sexes; interval between mesosternal lobes of male fully twice, generally more than twice, as long as broad.

*i*¹. Tegmina more or less, generally distinctly and profusely, maculate.

*j*¹. Lateral lobes of prozona with a generally distinct black band, rarely broken and then by no conspicuous pale oblique stripe.

32. *acrastator* (p. 196).

*j*². Lateral lobes of prozona with a distinct black band, always broken by a darker stripe and the hind femora distinctly though not conspicuously bifasciate..... 33. *virgatus* (p. 199).

33. *virgatus* (p. 199).

*i*². Tegmina immaculate or with the feeblest possible sign of maculation.

*j*¹. Whole body, including tegmina, very light colored, having a bleached appearance with no dark markings, except (and very rarely) dusky clouds on hind femora..... 34. *uniformis* (p. 201).

*j*². Whole body, including tegmina, moderately dark, the lateral lobes with a darker stripe and the hind femora distinctly though not conspicuously bifasciate..... 35. *angelicus* (p. 202).

*g*². Apical margin of subgenital plate of male entire; cerci either broad (broader than the frontal costa or fully as broad as it) and subequal; or else very unequal, tapering rapidly at the base and generally arcuate; hind tibiae usually red.

- h*¹. Supraanal plate regularly triangular with straight margins; subgenital plate with a postmarginal tubercle at apex (8. *Impudicus* series) 36. *impudicus* (p. 204).
- h*². Supraanal plate with sides more or less irregular or sinuate by lateral compression or by the depression of the apical half of the plate; subgenital plate with no postmarginal tubercle though sometimes with the margin itself apically thickened.
- i*¹. Interval between mesosternal lobes of male distinctly longer, generally much longer, than broad and much narrower than the lobes; metasternal lobes attingent or subattingent in the male (12. *Dawsoni* series).
- j*¹. Subgenital plate of male broad, at least as broad as long; cerci incurved feebly and gently or not at all; hind tibiae red.
50. *dawsoni* (p. 227).
- j*². Subgenital plate of male rather narrow, narrower than long, although short; cerci abruptly incurved apically; hind tibiae yellow.
- k*¹. Tegmina only attaining the tip of the hind femora; supraanal plate of male suddenly depressed in apical half; furcula slightly developed, shorter than last dorsal segment.
51. *gladstoni* (p. 229).
- k*². Tegmina considerably surpassing the tip of the hind femora; supraanal plate of male not apically depressed; furcula well developed, about one-third as long as the supraanal plate.
52. *palmeri* (p. 230).
- i*². Interval between mesosternal lobes of male quadrate, almost or a little transverse and but little narrower than the lobes; metasternal lobes of male only approximate (17. *Fasciatus* series).
- j*¹. Cerci no slenderer or hardly slenderer on apical than on basal half, far surpassing the supraanal plate; furcula very slight, not so long as last dorsal segment 77. *fasciatus* (p. 267).
- j*². Cerci much slenderer on apical than on basal half, shorter than the supraanal plate; furcula long and slender, reaching the middle of the supraanal plate..... 78. *borealis* (p. 270).
- f*². Subgenital plate of male conspicuously narrower at apex than at base (generally only half as wide), rarely at all elevated at apex above the lateral margins and never notched¹; cerci always distinctly narrowing on basal half, the upper angle of the apex prolonged and often subacuminate (19. *Femur-rubrum* series).
- g*¹. Distal half of male cerci much less than half as broad as the extreme base; interval between mesosternal lobes of male nearly or quite twice as long as broad; tegmina usually surpassing the hind femora.
- h*¹. Pronotum marked above with light carinal streaks on a dark ground; tegmina dark olivaceous green..... 81. *plumbeus* (p. 276).
- h*². Pronotum uniform in coloring above; tegmina dark fuscous.
- i*¹. Furcula not reaching or scarcely reaching the middle of the supraanal plate..... 82. *femur-rubrum* (p. 278).
- i*². Furcula extending considerably beyond the middle of the supraanal plate..... 83. *propinquus* (p. 285).
- g*². Distal half of male cerci distinctly more than half as broad as the extreme base; interval between mesosternal lobes of male scarcely if at all longer than broad; tegmina usually falling far short of the tips of the hind femora.

¹Except in *M. monticola*, where it is very broadly and shallowly notched by the tubercular elevation of the lateral extremities of the apical margin.

*h*¹. Apical margin of subgenital plate not elevated where it joins the lateral margins, so that it is straight as seen from behind.

84. *extremus* (p. 287).

*h*². Apical margin of subgenital plate elevated to form a tubercle where it joins the lateral margins, so that it is broadly notched as seen from behind..... 85. *monticola* (p. 290).

*c*². Cerci of male more or less expanded apically, so as to be broader at some point beyond the middle than at the middle, spatulate or subspatulate or apically bifurcate.

*d*¹. Cerci of male simply spatulate or subspatulate, at most moderately broad, apically entire and no broader than at base; furcula always developed as distinct denticulations, generally as long or very long ones.

*e*¹. Furcula of male long and prominent, the projecting portion much longer than the last dorsal segment from which it springs, generally more than a third as long as the supraanal plate.

*f*¹. Subgenital plate of male only moderately broad at apex, distinctly narrower than long, never in the least notched and rarely, and then but slightly, elevated apically; furcula rarely (and then but little) less, usually more, than half as long as the supraanal plate; hind tibiae green or blue, rarely (*M. complanatipes*) reddish yellow (20. *Cinereus* series).

*g*¹. Furcula of male only moderately broad at base, tapering uniformly, not more than half as long as the supraanal plate; cerci uniformly incurved throughout, not nearly reaching the tip of the supraanal plate; the latter abruptly and strongly contracted shortly before its tip.

*h*¹. Prozona of male quadrate or transverse; apical margin of subgenital plate of male, as seen from above, well rounded.

86. *bispinosus* (p. 292).

*h*². Prozona of male a little longer than its basal breadth; apical margin of subgenital plate of male, as seen from above, rounded angulate..... 87. *terminalis* (p. 293).

*g*². Furcula of male unusually broad at base, usually tapering unequally, the narrowing beginning beyond the base and leaving a portion of the apex equal and very slender, the whole considerably more than half the length of the supraanal plate; cerci bent suddenly inward before the tip and at the tip reassuming, at least in part, the original course, reaching the tip of the supraanal plate; the latter with no abrupt pre-apical constriction.

*h*¹. The distal twist of the male cerci conspicuous and involving the apical half of the same.

*i*¹. Furcula of male narrowing uniformly or almost uniformly throughout; hind margin of pronotum very obtusangulate; disk of pronotum dotted obscurely if at all with fuscous..... 88. *cyanipes* (p. 295).

*i*². Furcula of male with a considerable part of the apical portion equal and very slender; hind margin of pronotum only a little obtusangulate; disk of pronotum generally distinctly dotted with fuscous..... 89. *cinereus* (p. 296).

*h*². The distal twist of the male cerci inconspicuous, involving only the extreme tip.

*i*¹. Tegmina long and very slender, far surpassing the hind femora, without distinct spots; hind femora strongly compressed; hind tibiae reddish yellow..... 90. *complanatipes* (p. 298).

*i*². Tegmina of normal width and but little surpassing the hind femora, maculate along the discoidal area; hind femora normal; hind tibiae glaucous..... 91. *canonicus* (p. 300).

*f*². Subgenital plate of male very broad apically, nearly or quite as broad as long, apically generally notched, though very feebly; furcula rarely (and then but little) more than a third the length of the supraanal plate; hind tibiae usually red, but sometimes blue or green (21. *Angustipennis* series).

*g*¹. Hind tibiae red.

*h*¹. Prozona of male subquadrate; tegmina very slender, subequal, scarcely expanded on the costa; furcula of male with straight subparallel forks 92. *comptus* (p. 302).

*h*². Prozona of male distinctly longitudinal, much longer than its basal breadth; tegmina of ordinary breadth and costal expansion, tapering; furcula of male with arcuate, strongly divergent forks.

93. *coccineipes* (p. 303).

*g*². Hind tibiae glaucous.

*h*¹. Furcula of male not more than a third as long as the supraanal plate; tegmina lightly maculate or immaculate.

94. *angustipennis* (p. 305).

*h*². Furcula of male more than a third as long as the supraanal plate; tegmina usually heavily maculate..... 95. *impiger* (p. 306).

*e*². Furcula of male slight, the projecting portion not longer or scarcely longer than the last dorsal segment from which it springs.

*f*¹. Subgenital plate of male broad, throughout broader than the extreme base of the cerci; apical portion of supraanal plate suddenly depressed just beyond the middle; cerci moderately broad, not much narrowed in the middle, more or less suddenly bent inward near tip, exteriorly sulcate at apex (22. Packardii series).

*g*¹. Interval between mesosternal lobes of male nearly or quite twice as long as broad.

*h*¹. Median carina of pronotum obsolete or almost obsolete on the prozona, distinct but low on the metazona; extremity of male cerci nearly plane exteriorly or merely depressed within the margin; forks of furcula conspicuously divergent.

*i*¹. Prozona ordinarily with a broad median dark stripe, made more conspicuous by the much lighter colors on either side, or else light-brownish testaceous; antennae of male but little more than three-fourths as long as the hind femora; hind tibiae blue or red.

96. *packardii* (p. 309).

*i*². Prozona with uniform dingy coloring on disk; antennae of male almost as long as the hind femora; hind tibiae red. 97. *foedus* (p. 311).

*h*². Median carina of pronotum tolerably distinct on the prozona, at least anteriorly, distinct and moderately high on the metazona; extremity of male cerci deeply sulcate exteriorly or else tumid; forks of furcula parallel or only slightly divergent.

*i*¹. Larger species; narrowest part of interval between mesosternal lobes of male narrower than the narrowest part of frontal costa; sides of head and prozona rarely with any black band; interval between mesosternal lobes of female strongly transverse; hind femora red beneath; hind tibiae stout..... 98. *corpulentus* (p. 313).

*i*². Smaller species; narrowest part of interval between mesosternal lobes of male equal to the narrowest part of frontal costa; sides of head and prozona with a black band; interval between mesosternal lobes of female subquadrate; hind femora yellow beneath; hind tibiae slender..... 99. *conspersus* (p. 315).

*g*². Interval between mesosternal lobes of male subquadrate.

100. *compactus* (p. 316).

*f*². Subgenital plate of male very narrow and narrower apically than the extreme base of the cerci; supraanal plate on the same general plane throughout; cerci slender and much narrowed in the middle, gradually incurved, exteriorly tumid at apex (24. *Plebejus* series).

*g*¹. Subgenital plate of male, as seen from above, apically angulate and tuberculate..... 109. *marginatus* (p. 330).

*g*². Subgenital plate of male, as seen from above, apically well rounded and simple..... 110. *paroxyoides* (p. 331).

*d*². Cerci of male apically bifurcate, or with an inferior submedian process or abrupt angulation, or else expanded so as to be distinctly, generally much, broader apically than at the extreme base; furcula wanting or minute, rarely (*M. arizonae*) a fourth as long as the supraanal plate.

*e*¹. Size small or medium; cerci of male always bifurcate or with an inferior submedian process or abrupt angulation; supraanal plate pretty regularly triangular, with straight or feebly convex lateral margins; furcula usually distinctly developed, rarely (*M. collinus*) wanting; prosternal spine usually short (25. *Collinus* series).

*f*¹. Lower fork of bifurcation of male cerci much longer than the upper; apical margin of subgenital plate narrowly, abruptly, and considerably elevated.

*g*¹. Small species; interval between mesosternal lobes of male more than twice as long as broad; of female quadrate; median portion of male cerci cylindrical, not compressed..... 111. *alpinus* (p. 333).

*g*². Very small species; interval between mesosternal lobes of male half as long again as broad; of female transverse; median portion of male cerci compressed.....—..... 112. *infantilis* (p. 335).

*f*². Upper fork of bifurcation of male cerci longer than the lower, which is sometimes merely an inferior median or postmedian process; apical margin of subgenital plate elevated, if at all, only broadly, gradually, and a little.

*g*¹. Furcula of male distinctly present; apical margin of subgenital plate distinctly elevated more or less above the lateral margins.

*h*¹. Furcula of male consisting of slender spines, longer than the last dorsal segment; base of lateral margins of subgenital plates incurved.

*i*¹. Furcula of male less than a fourth as long as the supraanal plate; apical half of cerci bent upward from the basal course.

*j*¹. Prozona of male subquadrate; supraanal plate with the apical and basal portions in one plane; subgenital plate of equal or subequal breadth beyond the middle..... 113. *minor* (p. 337).

*j*¹. Prozona of male distinctly longitudinal; supraanal plate with the apical portion distinctly elevated above the median; subgenital plate distinctly narrowing beyond the middle.

114. *confusus* (p. 339).

*i*². Furcula of male half as long as the supraanal plate; anal cerci incurved but otherwise straight..... 115. *arizonae* (p. 340).

*h*². Furcula of male consisting of brief triangular lobes; base of lateral margins of subgenital plate not incurved.

*i*¹. Interval between mesosternal lobes of male twice as long as broad; upper fork of cerci scarcely bent upward above the trend of the basal stem.

*j*¹. Upper fork of male cerci much shorter than the stem; subgenital plate shorter than broad..... 116. *keeleri* (p. 341).

*j*². Upper fork of male cerci nearly as long as the stem; subgenital plate of equal length and breadth..... 117. *deletor* (p. 343).

*i*². Interval between mesosternal lobes of male scarcely longer than broad; upper fork of cerci bent distinctly upward.

118. *luridus* (p. 344).

*g*². Furcula of male absent; apical margin of subgenital plate not elevated above the lateral margins 119. *collinus* (p. 346).
*e*². Size medium or large; cerci of male rarely bifurcate or with an inferior process (and then the insect is of large size, which it never is in the alternate category, and the supraanal plate is distinctly shield-shaped, the apical half tapering with much greater rapidity than the basal; or the furcula is absent; or the interval between the mesosternal lobes of the male is three times as long as broad, which it never is in the alternate category); supraanal plate of variable shape; furcula either absent or very minutely developed; prosternal spine usually long.

*f*¹. Interval between mesosternal lobes of male nearly, fully, or much more than twice as long as broad; of female generally longer than broad, rarely quadrate; prosternal spine generally long; tegmina usually clear, or with a marked distinction in color between the dorsal and lateral areas, or with the angle between the two marked by a conspicuous light-colored stripe; head less prominent and with less prominent eyes in the male than in the alternate category, the front margin of the pronotum in no way flaring to receive the head.

*g*¹. Furcula of male entirely absent, or present only as a minute point or bead; hind tibiae usually yellow, but sometimes red (26. *Robustus* series).

*h*¹. Tegmina fully equal to or surpassing the hind femora; hind tibiae yellow.

*i*¹. Cerci of male boot-shaped, the apical foot as long as the basal leg, the apical margin deeply emarginate below; markings of the outer face of hind femora so run together as to be more longitudinal than transverse..... 120. *differentialis* (p. 349).

*i*². Cerci of male apically expanded only a little more above than below, the apical margin regularly or almost regularly convex; markings of outer face of hind femora transverse.

121. *robustus* (p. 354).

*h*². Tegmina somewhat abbreviated, not reaching the extremity of the hind femora; hind tibiae red or reddish yellow.

i. Apical margin of male cerci convex or angulato-convex.

*j*¹. Tegmina distinctly and considerably spotted with fuscous on the lateral face; cerci of male nearly equal on proximal half, the apical margin convex..... 122. *viola* (p. 355).

*j*². Tegmina almost uniformly fuscous on lateral face; cerci of male distinctly tapering on proximal half, the apical margin broadly angulate..... 123. *clypeatus* (p. 357).

k. Male cerci apically forked, the apical border being deeply emarginate..... 124. *furcatus* (p. 358).

*g*². Furcula of male distinctly present, though always very small, angulate, the angle rarely produced; hind tibiae never yellow, usually red, rarely purplish and yellow at tip (27. *Bivittatus* series).

*h*¹. Interval between mesosternal lobes of male distinctly more than twice as long as broad; pronotum with conspicuous light-colored lateral stripes on the disk, their outer margin at the position of lateral carinae.

*i*¹. Cerci of male very much more expanded apically above than below, the apical border slightly emarginate below.

*j*¹. Hind tibiae clear red throughout..... 125. *femoratus* (p. 360).

*j*². Hind tibiae purplish basally, yellow, rarely reddish, apically.
126. *bivittatus* (p. 363).

i. Cerci of male apically expanded but little more above than below; the apical border convex, with no emargination below.....

127. *thomasi* (p. 368).

*h*². Interval between mesosternal lobes of male a little less than twice as long as broad; pronotum unicolorous on disk, any lateral stripes being confined to the position of lateral carinae.

*i*¹. Prozona of male feebly longitudinal; apical margin of subgenital plate considerably elevated and truncate; furcula formed of apically rectangular lobes. 128. *garrovi* (p. 369).

*i*². Prozona of male distinctly longitudinal; apical margin of subgenital plate considerably prolonged and subtuberculate; furcula formed of rounded lobes with a slight prolongation.

129. *olivaceus* (p. 370).

*f*². Interval between mesosternal lobes of male subquadrate; of female transverse; prosternal spine short; tegmina maculate with roundish fuscous spots; eyes of male and head prominent, the front margin of the pronotum flaring to receive the head (28. *Punctulatus* series).

*g*¹. Of large size; furcula present as a pair of very small denticulations; apical margin of male cerci broadly convex, feebly emarginate on the lower half. 130. *arboreus* (p. 372).

*g*². Of medium size; furcula wanting; apical margin of male cerci angulato-convex with no inferior emargination. 131. *punctulatus* (p. 374).

1. LAKINUS SERIES.

In this small and compact group the prozona of the male is longitudinal, and the interspace between the mesosternal lobes in the same sex longer than broad, sometimes twice as long as broad. The antennae are rather short. The tegmina are but little longer than the pronotum, overlapping, and apically acuminate. The hind tibiae are glaucous (or pale red) with nine to twelve (normally ten) spines in the outer series.

The supraanal plate is subtriangular, with rather plane surface, except for the rather prominent ridges bordering and forming between them the median sulcus; the furcula consists of a pair of pointed slender teeth but little longer than the last dorsal segment; the cerci are very peculiar, enlarging and bullate beyond the base, but with angular margins, sulcate inferiorly, compressed but longitudinally convex exteriorly, abruptly narrowing beyond the middle and incurved, ending in a superior, short, flattened finger directed toward the tip of the supraanal plate; the subgenital plate is very short and apically very broad, subconical, with a strongly and abruptly elevated though laterally brief apical margin.

The three species belonging here are rather bulky insects, rather above the medium size for the genus, and they range from southwestern Nebraska and Colorado to central Mexico.

1. MELANOPLUS MARCULENTUS, new species.

(Plate X, fig. 1.)

Pezotettix marculentus BRUNER!, MS.

Brownish fuscous, often more or less testaceous. Head brownish testaceous, tending to flavous above, where there is a rather broad posteriorly enlarging median streak and a broad submedian brownish

piceous band; vertex somewhat tumid, barely elevated above the pronotum, the interspace between the eyes nearly (male) or much more than (female) twice as broad as the first antennal joint; fastigium distinctly sulcate, with elevated rounded margins; frontal costa fading just before the clypeus at least in the male, slightly narrowed above, as broad as the interspace between the eyes (or barely narrower in the female), slightly sulcate excepting above, punctate throughout; eyes of moderate size, slightly prominent in the male, barely longer (male) or barely shorter (female) than the infraocular portion of the genae; antennae rufous, sometimes a little infuscated apically, two-thirds (male) or less than three-fifths (female) as long as the hind femora. Pronotum slightly (male) or distinctly (female) enlarging from in front posteriorly, the disk rounded subrectiform, passing by a distinct but rounded angle into the gently tumid subvertical lateral lobes, often with feeble subflavous lateral stripes next the lateral carinae, the upper half of the lateral lobes of the prozona occupied by a more or less distinct blackish (sometimes piceous) belt, sometimes followed below by luteous flecks; median carina percurrent but less distinct on the prozona than on the metazona, generally subobsolete between the sulci in the male; front margin faintly convex, hind margin very broadly obtusangulate, sometimes rotundato-obtusangulate; prozona distinctly longitudinal (male) or faintly longitudinal or quadrate (female), fully a third (male) or but little (female) longer than the finely punctate metazona. Prosternal spine moderately long, appressed conical, rather bluntly pointed, a little retrorse; interspace between mesosternal lobes from half as long again as broad to twice as broad with divergent sides (male) or transverse but much narrower than the lobes (female), the metasternal lobes subattinent (male) or approximate (female). Tegmina ovate lanceolate, apically acuminate, overlapping, somewhat longer than the pronotum, brownish fuscous, generally with a narrow median line of alternating blackish and flavous dots or dashes; wings pale flavous, sublinear, aborted. Fore and middle femora considerably tumid in the male; hind femora testaceous, more or less suffused either with ferruginous or olivaceous, the outer face often infuscated, especially in the upper half, the upper face and especially its inner half bimaculate with blackish fuscous, which sometimes invades the flavo-testaceous inner face, the lower face more or less rufous or ferruginous, the genicular arc piceous; hind tibiae glaucous, the spines pallid at base, black apically, nine to twelve (usually ten) in number in the outer series. Extremity of male abdomen clavate but apically conical, much recurved, the supraanal plate triangular, with feebly convex sides, bluntly acutangulate apex, and surface nearly plane except for the rather high, percurrent but apically obsolete, submedian ridges bounding the moderately narrow median sulcus; furcula consisting of a pair of small and short, subparallel, tapering, pointed fingers or spines lying on the outer side of

the submedian ridges of the supraanal plate, and projecting over it by a little more than the length of the last dorsal segment; cerci bullate, strongly incurved, exteriorly flattened but a little convex longitudinally, at first enlarging and swelling, the inferior margin bent roundly at a right angle in the middle (before which the margin itself is transversely abruptly rectangulate, beyond it acutangulate, so that the lower face is sulcate), then suddenly contracted, with the upper portion produced as a short, tapering, bluntly pointed, compressed finger, which does not reach the tip of the supraanal plate; subgenital plate very much broader than long, subconical, the apical margin abruptly and greatly elevated, thickened and well rounded.

Length of body, male, 17 mm., female, 22.5 mm.; antennae, male, 7 mm., female, 7.25 mm.; tegmina, male, 6 mm., female, 7.25 mm.; hind femora, male, 10.5 mm., female, 13.5 mm.

Thirty-two males, 42 females. Montelovez, Coahuila, Mexico, September 20, E. Palmer; Sierra Nola, Tamaulipas, Mexico, December 3-6, E. Palmer; Sierra de San Miguelito, and mountains twelve leagues east of San Luis Potosi, Mexico, E. Palmer; San Luis Potosi, Mexico, October, E. Palmer, E. Barroeta; Bledos, San Luis Potosi, Mexico, October 1, E. Palmer; Zacatecas, Mexico, November (L. Bruner); Aguas Calientes, Mexico, November (L. Bruner).

2. MELANOPLUS LAKINUS.

(Plate X, fig. 2.)

Pezotettix lakinus SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), pp. 79-80; Cent. Orth. (1879), pp. 68-69.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59; Bull. Washb. Coll., I (1885), p. 136; Publ. Nebr. Acad. Sc., III (1893), p. 27.

Vertex of the head gently tumid, scarcely elevated above the pronotum, the interspace between the eyes half as broad again as the first antennal joint; fastigium broad, shallow, flat, expanding in front, the bounding walls low and thick; frontal costa moderate, slightly expanded at the ocellus, sulcate almost throughout, only the summit flat, about as broad as the interspace between the eyes; eyes rather small, not prominent, about as long as the infraocular portion of the genae; antennae about three-fourths (male) or about two-thirds (female) as long as the hind femora. Pronotum short, especially in the female, but simple, expanding slightly posteriorly, either half of the lateral lobes of the prozona slightly and independently tumid in the male; front border truncate, hind border very little angulated and rounded; median carina slight but distinct, equal; lateral carinae well marked, forming a nearly square shoulder, especially on the hinder portion of the prozona; prozona longitudinal (male) or subquadrate (female), slightly (male) or scarcely (female) longer than the finely punctate metazona. Prosternal spine moderately long, a little shorter in the female than in the male,

conical, feebly appressed, slightly retrorse; interspace between mesosternal lobes half as long again as broad (male) or subquadrate (female), the metasternal lobes attigent (male) or approximate (female.) Tegmina abbreviate, overlapping, lanceolate, sharply pointed, longer than the pronotum, fully twice as long as broad, their inner and costal margins about equally convex. Extremity of male abdomen a little clavate, considerably recurved, bluntly conical, the supraanal plate triangular, as long as broad, the sides nearly straight, the tip rounded; furcula consisting of a pair of rather distant processes, broad at base, with a slight tapering pointed projection, the whole very small; cerci very tumid, spherico-triangular at base, carinate on the posterior outer margin, with a slight, equal, and blunt-tipped finger, shorter than the base, extending inward and upward from the basal swelling; subgenital plate short, considerably broader at apex than long, because the extreme posterior margin is produced to form a rather large rounded elevation nearly as high as broad.

The general color is a brownish griseous, tinged below with yellowish; the antennae are dark and sometimes darker apically; along the top of the head and pronotum is a blackish fuscous rather broad median stripe, sometimes broadening in patches, sometimes obsolete; the upper half of the lateral lobes of the prozona is marked by a broad blackish fuscous belt, which is often separated from the front margin and the frequent extension of the band to the eyes by a narrow yellow line. The tegmina are uniformly griseous, with a slender median line of alternate yellowish and fuscous flecks, often obsolete. The hind femora are lighter or darker testaceous, with two very broad, oblique, blackish purple belts, which do not reach the pale orange under surface; hind tibiae dull glaucous, the spines pale at base, black tipped, ten to eleven, usually ten, in number in the outer series. Sides of abdomen marked with black at base.

Length of body, male, 22 mm., female, 29 mm.; antennae, male, 9 mm., female, 9.5 mm.; tegmina, male and female, 7 mm.; hind femora, male, 12.5 mm., female, 14 mm.

Seven males, 7 females. Between Lincoln, Nebraska, and Denver, Colorado, October 3; Lakin, Kearny County, Kansas, 3,000 feet, September 1; Colorado (C. P. Gillette); Colorado, 5,500 feet, Morrison; Pueblo, Colorado, 4,700 feet, August 30-31; Las Cruces, Donna Ana County, New Mexico, T. D. A. Cockerell.

It is also reported from southwest Nebraska (Bruner).

This species is very closely allied to the last, differing from it in its narrower interspace between the sternal lobes, the oblique bands on the outer face of the hind femora, the more distant forks of the furcula of the male, and the stouter apical process of the subgenital plate; the cerci are much the same.

3. MELANOPLUS SONORAE, new species.

(Plate X, fig. 3.)

Pale testaceous (alcoholic specimens). Head not prominent, uniform in coloring except for a sometimes obsolete median black stripe on summit, and a broad postocular piceous band; vertex feebly tumid, not or slightly elevated above the pronotum, the interspace between the eyes half as broad again (male), or nearly twice as broad (female) as the first antennal joint; fastigium steeply declivent, sulcate throughout, more broadly in the female than in the male; frontal costa percurrent, rather prominent above but shallow below, equal except for a sudden and slight contraction between the antennae,¹ fully as broad as the interspace between the eyes, faintly sulcate at and below the ocellus, finely and faintly punctate throughout; eyes of medium size and prominence, longer, in the male much longer, than the infraocular portion of the genae; antennae testaceous, nearly two-thirds (male) or one-half (female) as long as the hind femora. Pronotum compressed, unusually equal, scarcely or not expanding on the metazona, the disk very uniform, broadly convex, passing by a rounded angle into the inferiorly vertical faintly tumid lateral lobes without forming lateral carinae; a broad piceous belt, sometimes obscured, occupies the upper half of the lateral lobes of the prozona: median carina distinct, percurrent, equal; front margin subtruncate, hind margin very obtusangulate; prozona distinctly (male) or feebly (female) longitudinal, about a fourth longer than the finely punctate metazona, which encroaches upon it mesially by the angularity of the principal sulcus. Prosternal spine rather long, appressed conical, a little retrorse, bluntly pointed; interspace between mesosternal lobes subequal, a little longer than broad (male) or transverse but narrower than the lobes (female). Tegmina abbreviate, ovate-lanceolate, overlapping, from a little longer than the pronotum to a third as long again, apically rather abruptly acuminate, brownish-testaceous, sometimes with feeble signs of a slender line of maculations. Fore and middle femora of the male a little tumid; hind femora slender, testaceous (apparently olivaceo-testaceous), sometimes bimaculate with fuscous on the inner half of the upper face, with black genicular arc; hind tibiae pale red (?), apically infuscated, the spines pallid at base and black beyond, ten to eleven, rarely twelve, in number in the outer series. Extremity of male abdomen clavate, strongly recurved, the supraanal plate triangular but suddenly tapering a little more rapidly just before the rectangular apex, the margins not in the least elevated, the surface sloping in a concave curve to the summit of the very sharp and rather high submedian ridges inclosing the very deep and rather narrow percurrent median sulcus, whose margins are

¹In one female specimen this is abnormally extended to nearly the whole supra-ocellar region, narrowing the costa by one-half.

a little contracted in the middle; furcula consisting of a pair of rather distant, moderately slender, scarcely tapering, blunt, dark denticulations, overlying the outer slopes of the submedian ridges of the supraanal plate, and extending over the plate by only a little more than the length of the last dorsal segment; cerci strongly compressed-bullate just beyond the base, the bullate portion broader than long and exteriorly very strongly and longitudinally convex, beneath sulcate, the whole bullate portion abruptly narrowing and terminating in a compressed, indirected, round-tipped, equal and short finger, falling a little short of the tip of the supraanal plate; subgenital plate short, subconical, and apically very broad by the abrupt rounded production of the apical margin, the process of about equal height and posterior breadth, entire.

Length of body, male, 16 mm., female, 22 mm.; antennae, male, 6.5 mm. (est.), female, 6 mm.; tegmina, male and female, 6 mm.; hind femora, male, 10.25 mm., female, 12 mm.

One male, 4 females. Sonora, Mexico, A. Schott, Mexican Boundary Survey.

This species differs from the preceding two in the uniformity of the pronotum, which does not expand posteriorly, and has a uniformly sharp median carina throughout; it is also lighter bodied and less heavily marked.

2. FLABELLIFER SERIES.

In this series, one of the few which combines macropterous and brachypterous forms, the male prozona is feebly or distinctly longitudinal, occasionally quadrate, the interspace between the mesosternal lobes of the same sex varying from quadrate to half as long again as broad, or somewhat more. The tegmina are either fully developed, though at most but slightly surpassing the hind femora, much and irregularly maculate; or half as long as the abdomen, heavily marked in the discoidal field and subacuminate; or shorter than the pronotum and then apically rounded. The length of the tegmina in each species, however, is fixed. The hind tibiae are blue, with nine to eleven spines in the outer series, or, in some brachypterous forms, red, with ten to thirteen spines in the outer series.

The supraanal plate is triangular, rather longer than broad, with no or slightly developed transverse ridges. The furcula is minute or subobsolete, except in a single instance where it is small. The cerci are broad, often excessively broad and flabellate, enlarging from the base toward the middle, at least in the macropterous forms, rarely as much as twice as long as broad, broadly rounded apically. The subgenital plate is short and broad, sometimes with a slight apical tubercle, the lateral margins straight, the apical margin not elevated, or only in a single instance.

M. rileyanus is the most aberrant form, having very brief tegmina,

the furcula longer than the last dorsal segment, and the lateral margins of the subgenital plate slightly elevated apically.

The species, six in number, are evenly divided between macropterous and brachypterous forms—and this is the only homogeneous series of *Melanoplus* in which they are so—of small or rather small size, and are found only in the district to the west of the Mississippi and mainly in the Cordilleran region. They have not been reported north of the United States, and a single species has been found to extend south of our boundary in northern Mexico; while another species is known only from California and is the only one occurring west of the Sierra Nevada, (the same species, *M. rileyanus*, mentioned above).

4. MELANOPLUS OCCIDENTALIS.

(Plate X, fig. 4.)

Caloptenus occidentalis THOMAS!, Ann. Rep. U. S. Geol. Surv. Terr., V (1872), p. 453, pl. II, fig. 2.—GLOVER, Ill. N. A. Ent., Orth. (1872), pl. XI, fig. 2.—THOMAS!, Rep. U. S. Geol. Surv. Terr., V (1873), p. 161; ? Rep. Geol. Geogr. Surv. 100th mer., V (1875), p. 893; ? Proc. Dav. Acad. Sc., I (1876), p. 261.—SCUDDER, Bull. U. S. Geol. Surv. Terr., II (1876), p. 261.—THOMAS, *ibid.*, IV (1878), p. 484.—BRUNER, Can. Ent., IX (1877), p. 145.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 43.—BRUNER, Bull. Div. Ent. U. S. Dep. Agric., II (1883), p. 9; *ibid.*, III (1883), p. 60.

Melanoplus variolosus SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), pp. 67-68; Cent. Orth. (1879), pp. 56-57.—BRUNER, Rep. U. S. Ent. Comm., III (1883) p. 61.

Melanoplus occidentalis BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 28.

Of medium or rather small size. Head very slightly elevated, a very little arched; fastigium rather shallow, particularly in the female, the margins in front of the eyes blunt, gently diverging and then converging, but in the female subparallel; interspace between the eyes as broad (male) or half as broad again (female) as the first antennal joint; frontal costa more than usually prominent, about as broad as the interspace between the eyes, scarcely contracted above, scarcely enlarged at the ocellus, at and below which it is somewhat sulcate; eyes rather prominent, anteriorly truncate; antennae somewhat more (male) or slightly less (female) than three-fourths as long as the hind femora. Pronotum enlarging on the metazona, laterally subtumid in an irregular way on the prozona, the metazona faintly punctate; front margin feebly convex, with a feeble median emargination; hind margin roundly obtusangulate; median carina distinct on the metazona, faint on the prozona, obsolete between the sulci; sides of the pronotum hardly shouldered or with very rounded shoulders; transverse sulci of prozona pretty distinct and continuous; prozona longitudinal, a little longer than the metazona (male) or transverse, no longer than the metazona (female). Prosternal spine rather short, appressed conical, broadly rounded at tip, a little retrorse; interspace between mesosternal lobes about half as long again as broad (male) or transverse (female).

Tegmina extending to or a little beyond the tip of the abdomen, slender, scarcely tapering, profusely maculate throughout, as described below. Supraanal plate of male rounded triangular, pointed, fully as broad as long; firecula consisting of minute triangular denticles; cerci flabellate, each consisting of a very broad, upturned lateral lamella, whose anterior edge is gently convex, whose lower is strongly convex only at the expanded base and there thickened, the tip rounded, angular, and the whole half as long again as the extreme width; subgenital plate shallowly scoop-shaped, the apical edge entire, but just below it, at the extremity, a conical tubercle. Basal tooth of the lower valve of the ovipositor of the female sharp, triangular, nearly as long as broad.

The general color is a ferruginous-brown above, mottled strongly with blackish-fuscous, livid-brown below; a blackish-brown median stripe, broadening posteriorly, passes from between the eyes to the back of the head, but seldom continues, and then less deeply, upon the pronotum; the face and genae vary from yellow to testaceous and are seldom blotched by dusky colors, excepting on the genae; the antennae are of a lighter or darker testaceous, and are scarcely infuscated at tip; a more or less broken black patch occupies the upper part of the anterior half of the lateral lobes. The tegmina are dark brownish cinereous, with a slender median yellow stripe, frequently broken by quadrate fuscous or blackish spots, and similar spots are scattered rather distantly all over the tegmina, giving them an unusually speckled appearance; wings hyaline, the veins glaucous, except anteriorly. Hind femora variable, either with oblique pale patches on a dark ground or—and generally—the reverse; hind tibiae glaucous, with black-tipped spines, ten or eleven in number in the outer series.

Length of body, male, 18 mm., female, 25 mm.; antennae, male, 9.5 mm., female, 10.25 mm.; tegmina, male, 16 mm., female, 21 mm.; hind femora, male, 11.5 mm., female, 14 mm.

Sixteen males, 12 females. Yellowstone, Montana (U.S.N.M.—Riley collection); Eastern Wyoming (same); Sweetwater and Cottonwood, Wyoming (same); Cheyenne, Laramie County, Wyoming (same); Douglas, Converse County, Wyoming, Bruner (same); Sidney, Cheyenne County, Nebraska, August (L. Bruner); Fort Robinson, Dawes County, Nebraska, August 22, Bruner (U.S.N.M.—Riley collection); Western Kansas, July (same); Lakin, Kearny County, Kansas, 3,000 feet, September 1; Colorado, 5,500 feet, Morrison; Pueblo, Colorado, 4,700 feet, July 8-9, August 30-31; Garden of the Gods, El Paso County, Colorado; Salida, Chaffee County, Colorado, July 3 (U.S.N.M.—Riley collection); Magdalena, Socorro County, New Mexico (University of Kansas); Fort Wingate, Bernalillo County, New Mexico (U.S.N.M.—Riley collection).

It has also been reported from Bismarck, North Dakota (Bruner), Minnesota (Thomas), Salt Lake, Utah (Seudder), and Spring Lake, Utah (Thomas).

5. MELANOPLUS CUNEATUS, new species.

(Plate X, fig. 5.)

Melanoplus cuneatus BRUNER!, MS.

Brownish testaceous, darker above. Head luteo-testaceous, with the lateral ridges of the fastigium black, the posterior part of the vertex with a median triangular blackish stripe, a broken black edging to the upper posterior part of the eyes and, joining it, a black band behind the eyes; vertex tumid, much elevated above the pronotum, the interspace between the eyes not very broad, about as broad as the basal antennal joint, the fastigium deeply sulcate; frontal costa subequal, rather narrower than the interspace between the eyes, shallowly sulcate excepting above; eyes rather large, prominent, about as long as the infraocular portion of the genae; antennae fulvo-testaceous, about three-fourths as long as the hind femora. Pronotum feebly constricted mesially, expanding almost as much anteriorly as posteriorly, the front margin feebly convex, the hind margin obtusangulate, the lateral lobes lighter colored than the disk, but on the prozona marked above with a broken blackish fuscous band, the impressed middle line of the posterior section black; median carina pereurrent, but slighter on the prozona than on the metazona, subobsolete between the sulci, the lateral carinae forming a rounded shoulder on the metazona, obsolete on the prozona. Prosternal spine moderately short, appressed conical, blunt, slightly retrorse; interspace between mesosternal lobes of male half as long again as broad. Tegmina surpassing a little the hind femora, not very slender, subequal, much maculate along the discoidal area but not elsewhere; wings hyaline. Hind femora brownish testaceous, crossed above and externally by two very oblique fuscous bars, which above are premedian and postmedian, the inner and under surfaces pale coralline, the genicular arc black; hind tibiae glaucous with a slender dusky patellar spot, the spines black nearly to the base, nine to ten, usually ten, in number in the outer series. Extremity of male abdomen feebly compressed, not clavate, scarcely upturned, the supraanal plate triangular, either lateral half broadly and shallowly sulcate and separated by sharp but not very high walls from the rather deep and apically narrowing and fading median sulcus; furcula composed of a pair of minute projecting angulations surmounting the ridges of the supraanal plate; cerci bent inwards almost from the base, very broad, broadening mesially by their inferior expansion, the lower margin suddenly bent at the middle, so that the apical half narrows rapidly and has an upward direction, well and rather narrowly rounded, even subangulate, at tip, the whole only half as long again as broad and yet longer than the supraanal plate; subgenital plate exceedingly small and of about equal length and breadth, subconical, with scarcely any trace of an apical tubercle, except that formed by the shape of the plate as a whole.

Length of body, male, 21 mm.; antennae, 9 mm.; tegmina, 16.5 mm.; hind femora, 12 mm.

Three males. Silver City, Grant County, New Mexico, (U.S.N.M.—Riley collection); Fort Grant, Graham County, Arizona (same); and Fort Whipple, Yavapai County, Arizona, Palmer.

6. MELANOPLUS FLABELLIFER.

(Plate X, fig. 6.)

Melanoplus flabellifer SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), pp. 68-69; Cent. Orth. (1879), pp. 57-58.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 61; Bull. Washb. Coll., I (1886), p. 200; Publ. Nebr. Acad. Sc., III (1893), p. 28.

Melanoplus occidentalis TOWNSEND!, Ins. Life, VI (1893), p. 31.

Of rather small size. Head scarcely elevated, well arched; interspace between the eyes rather broader than the first joint of the antennae, the fastigium faintly subspatulate, pretty deep, with abrupt but blunt, rounded walls; frontal costa narrower than the interspace between the eyes, slightly contracted above and very slightly just below the ocellus; otherwise scarcely enlarging from above downward, scarcely depressed above the ocellus, strongly sulcate at and below the same; eyes neither large nor very prominent; antennae pale castaneous, paler at base, about three-fourths (male) or less than two-thirds (female) as long as the hind femora. Pronotum rather simple, the metazona expanding somewhat, the unequal halves of the prozona each slightly tumid laterally, and as a whole slightly expanding anteriorly; front margin feebly sinuate, hind margin roundly obtusangulate; median carina nearly obsolete between the sulci, but otherwise nearly equal; transverse sulci of the prozona pretty distinct, the posterior severing the median carina; metazona scarcely punctate; prozona subquadrate, slightly longer than the metazona, or, in the female, sometimes subequal. Prosternal spine short, stout, appressed conical, very blunt tipped, hardly retrorse; interspace between the mesosternal lobes subquadrate, a little longer than broad (male) or transverse (female). Tegmina reaching (female) or slightly surpassing (male) the tip of the hind femora, not very slender, subequal. Supraanal plate of male triangular, bluntly pointed, the sides a little convex, rather longer than broad; furcula formed of distinct, pointed, triangular teeth; cerci large, flabellate, upturned, twice as long as the mean breadth, tapering but little, the extremity broadly rounded; subgenital plate prow-shaped, straight, ending in a blunt conical projection.

The general color is cinereo-plumbeous, the head and pronotum dusky above, with the usual black belt behind the eye, extending over the prozona. Tegmina dark fuscous, especially at base, sprinkled with dusky spots; wings hyaline, sometimes with a feeble bluish tinge, the anterior venation dusky. Hind femora livid brown on the outer face, heavily marked with rufo-fuscous in oblique bands, orange beneath;

hind tibiae rather dark glaucous, the spines black, nine to eleven in number in the outer series.

Length of body, male, 16.5 mm., female, 18 mm.; antennae, male, 7.2 mm., female, 6 mm.; tegmina, male, 13.75 mm., female, 13.5 mm.; hind femora, male, 9.5 mm., female, 9.75 mm.

Nine males, 5 females. Montana (U.S.N.M.—Riley collection): Finney County, Kansas, September, H. W. Menke (University of Kansas); between Smoky Hill, Kansas, and Denver, Colorado, September, L. Agassiz (Museum Comparative Zoology); Colorado Springs, El Paso County, Colorado, August, E. S. Tucker (same); Garden of the Gods, El Paso County, Colorado, October 6; South Park, Colorado, 8–10,000 feet, August 11, 16; Salt Lake Valley, Utah, September (U.S.N.M.—Riley collection); Johnson's Basin, New Mexico, June 22, Townsend (L. Bruner); Zacatecas, Mexico, November (same).

It is also reported by Bruner from Idaho, Wyoming, and western Nebraska.

7. MELANOPLUS DISCOLOR.

(Plate X, fig. 7.)

Pezotettix discolor SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), pp. 81–82; Cent. Orth. (1879), pp. 70–71.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 58.

Vertex tumid, considerably elevated above the pronotum; interspace between the eyes half as broad again as the basal antennal joint, the fastigium shallow, indistinct, broad, enlarging apically; frontal costa broad, equal, flat (male) or slightly tumid (female) above, sulcate below; antennae three-fourths (male) or hardly two-thirds (female) as long as the hind femora. Pronotum simple, scarcely enlarging on the metazona, the front border straight, the hind border roundly and broadly angulate; median carina distinct though rather slight, equal; lateral carinae scarcely perceptible; metazona faintly punctate; prozona slightly longitudinal (male) or quadrate (female), about a fourth longer than the metazona. Prosternal spine moderately long, cylindrical, blunt, erect; interspace between mesosternal lobes twice (male) or almost twice (female) as long as broad; metasternal lobes attingent (male) or approximate (female). Tegmina a little longer than head and pronotum together, tapering, the dorsal and lateral fields angularly separate. Supraanal plate of male triangular, longer than broad, pointed, the sides straight; furcula consisting of a pair of approximate, small, triangular teeth, the tips a little produced; cerci forming on each side a broad, semicircular, rounded flap, the upper side concave, the lower convex, the tip rounded, the whole in one plane; subgenital plate conical, longer than broad, the tip compressed.

The general color is a yellowish or cinereous brown above, a paler brownish yellow below. The antennae are pale red, infuscated apically; a very broad, straight, piecous belt, slightly larger behind than in front, extends from behind the eyes across the prozona, its upper edge

at the lateral carinae; an oblique euneiform yellow dash, the apex in front and above, follows the ridge of the metathoracic episterna, margined on either side by an equal piceous belt. The dorsal field of the tegmina is of the same color as the disk of the pronotum, or occasionally a little paler, while the lateral field is nearly always much darker brown, the discoidal area marked by dashes of blackish fuscous, which occasionally suffuses nearly the whole of the lateral field. The hind femora are twice barred with blackish above, and have more or less blackish fuscous on their outer face; while the under portion of the femora is yellowish, and the hind tibiae red with black-tipped spines, twelve, rarely thirteen, in number in the outer series.

Length of body, male, 19 mm., female, 25 mm.; antennae, male, 9 mm., female, 18.5 mm.; tegmina, male, 8 mm., female, 9.5 mm.; hind femora, male, 12 mm., female, 13.5 mm.

Three males, 6 females. Dallas, Texas, J. Boll.

8. MELANOPLUS SIMPLEX, new species.

(Plate X, fig. 8.)

Ashen brown, darker above, sometimes darker throughout, with a postocular piceous band. Head not at all prominent, luteo-testaceous with a feeble olivaceous tinge, the summit with a pair of submedian triangular stripes posteriorly; vertex tumid, elevated above the pronotum, the interspace between the eyes not very narrow, slightly broader than the first antennal joint; fastigium strongly declivent, broadly sulcate anteriorly, more deeply in the male than in the female; frontal costa as broad as the interspace between the eyes, equal, faintly depressed at the ocellus, seriatly punctate at the sides; eyes rather large, rather prominent in the male, a little longer than the infraocular portion of the genae; antennae dark ferruginous, about two-thirds as long as the hind femora, of similar relative length in the two sexes. Pronotum short, subequal, scarcely enlarging posteriorly, slightly darker on the disk than on the lateral lobes and more or less feebly punctate or blotched with fuscous, the lateral lobes with a broad, equal, piceous band, extending from behind the eyes across the upper part of the prozona; front margin feebly convex, hind margin broadly angulate; the median carina sharper on the metazona than on the prozona but hardly more prominent, the disk separated from the slightly tumid lateral lobes by a blunt angle, but without distinct lateral carinae: prozona in both sexes slightly longitudinal, about a fourth longer than the feebly punctate metazona. Prosternal spine rather long, not slender, and erect, cylindrical and very blunt (male) or conical but not acuminate (female); interspace between mesosternal lobes somewhat longer than broad (male) or distinctly transverse (female), the metasternal lobes attingent over a short space (male) or approximate (female). Tegmina slightly or considerably longer than the head and

pronotum together, sublanceolate, subacuminate, brownish fuscous, the discoidal area sometimes with feebly alternating darker and lighter dashes. Hind femora externally varying from fusco-olivaceous to fusco-testaceous, the lower and inner faces flavous, the latter as well as the inner half of the upper face barred at base and before and beyond the middle with fuscous or blackish fuscous, the outer half of the upper face more or less infuscated throughout, the genicular arc black; hind tibiae red, the spines black only on their apical half, eleven or twelve in number in the outer series. Extremity of male abdomen slightly clavate, much upturned, the supraanal plate triangular with straight sides and acute apex, the rather broad, deep, median sulcus bounded by very high, sharp walls; furcula consisting of a pair of minute, acute denticulations overlying the ridges of the supraanal plate; cerci broad, arcuate, especially by the curvature of the lower margin, tapering only in the apical half, well rounded apically, much less than twice as long as broad, but nearly as long as the supraanal plate, hardly incurved, the apical portion feebly sulcate exteriorly; infracercal plates large, basally nearly as broad as the cerci, rapidly narrowing and extending slightly beyond the supraanal plate; subgenital plate broad and rather short, the lateral margins straight, apically acutely rounded, neither prolonged nor elevated.

Length of body, male, 14 mm., female, 20 mm.; antennae, male, 6.5 mm., female, 7.5 mm.; tegmina, male, 5 mm., female, 8.25 mm.; hind femora, male, 9 mm., female, 11 mm.

Two males, 1 female. Colorado, 5,500 feet, Morrison (S. Henshaw; S. H. Scudder).

9. MELANOPLUS RILEYANUS (new species).

(Plate X, fig. 9.)

Pezotettix rileyanus McNEILL!, MS.

Dark brownish testaceous, with a broad, lateral piceous stripe. Head rather prominent, dark testaceous, sometimes with a feeble olivaceous tinge, much flecked and punctate with fuscous, above much infuscated; vertex somewhat tumid, distinctly elevated above the pronotum, the interspace between the eyes rather narrow, narrower than the first antennal joint (male) or rather broad, distinctly broader than that joint (female), the fastigium with slight, raised, rounded ridges next the eyes, but otherwise scarcely sulcate (female) or distinctly sulcate throughout (male); frontal costa moderately broad, fully as broad as (male) or rather narrower than (female) the interspace between the eyes, subequal, strongly punctate throughout, feebly sulcate at and below the ocellus; eyes large and moderately prominent, distinctly longer than the infra-ocular portion of the genae; antennae luteo-testaceous, nearly (male) or but little more than half (female) as long as the hind femora. Pronotum

rather short and subequal, faintly constricted mesially, more or less faintly punctate with fuscous above, the lateral lobes with a broad piceous belt crossing the prozona above, and sometimes continued across the metazona, but usually obsolete or subobsolete there, sometimes fading, sometimes sharply defined below, the lower portion of the lobes usually lighter colored than elsewhere, repeating the color of the genae; front margin subtruncate, hind margin very broadly rotundato-angulate, in some females with no sign of angulation but very broadly convex; median carina percurrent but generally feebler on the prozona; lateral carinae marked by a distinct though rounded angle; prozona distinctly longitudinal (male) or subquadrate (female), one-fourth to one-third longer than the closely punctate metazona. Prosternal spine short (female) or very short (male), conical, erect; interspace between the mesosternal lobes nearly twice as long as broad (male) or slightly longer than broad (female). Tegmina ovate, well rounded, much less than twice as long as broad, rather shorter than the pronotum, brownish fuscous, generally cinereous in the anal field. Hind femora fusco-ferruginous or fusco-testaceous, twice banded rather obliquely with black, which is confluent on the lower half of the outer face, so as to leave above a large basal and median patch of the lighter color; the lower face is reddish, and the genicular are fuscous; hind tibiae glaucous, often mottled or suffused with luteous toward the base, and generally with a basal annulus of the same, the spines black in their apical half, ten to twelve in number in the outer series. Extremity of male abdomen oblong clavate, well rounded, well upturned, the supraanal plate triangular with slightly convex sides and rectangulate apex, the median sulcus slender, not very deep, and percurrent, bounded by sharp but not very high walls; furecula consisting of a pair of elongate, slender, parallel, straight denticulations or fingers as long as the last dorsal segment, resting outside the ridges of the supraanal plate; cerci enlarging slightly at the base, then gradually enlarging in the basal half, beyond equal, apically well rounded, the whole forming a broad, much incurved and slightly torqueate plate, whose apical half is so deeply sulcate that its longitudinal halves are nearly at right angles; infracercal plates concealed; subgenital plate broad, fully as broad as long, the lateral margins abruptly elevated a little apically, but not prolonged posteriorly, the apical margin strongly rounded, entire.

Length of body, male, 17 mm., female, 20 mm.; antennae, male, 9 mm., female, 6 mm.; tegmina, male, 3 mm., female, 4.25 mm.; hind femora, male, 10 mm., female, 11 mm.

Six males, 17 females. Yuba County, California (L. Bruner); Mountains near Lake Tahoe, Placer County, California, October, Henshaw. Wheeler's expedition, 1876; Kern County, California, October (U.S. N.M.); Kern County, California, Coquillett (U.S.N.M.—Riley collection); Los Angeles County, California, May, September, Coquillett (same).

3. BOWDITCHI SERIES.

In this series the male prozona is slightly longitudinal, and the interspace between the mesosternal lobes exceptionally narrow, being more than twice, in the male, several times, as long as broad, while the metasternal lobes are attingent over considerable space in the male, approximate in the female. The tegmina, especially those of the male, are rarely, and then but little, maculate, always fully developed and surpassing the hind femora; the hind tibiae are green or blue, with nine to eleven, usually ten, spines in the outer series. The antennae are of very unequal length in the two sexes.

The supraanal plate is more or less clypeate, the apex always well angulate, and the median sulcus almost or quite obsolete; the most striking feature is the furcula, which consists of a pair of long, very broad, parallel, depressed plates, reaching about to the middle of the supraanal plate and at base largely concealing it, apically narrowed partly or wholly by their interior rounded emargination; the cerci are small, the apical portion subequal, nearly straight, and about half as broad as the base; the subgenital plate is somewhat narrower than long, subequal, apically extended slightly but not elevated, the lateral margins straight and on a line with the upper side of the last abdominal segments, the apical margin well rounded as seen from above and entire.

The species, six in number, are of medium or rather large size and are found almost altogether in the southwest; only one is known east of the Mississippi, and that only in the neighborhood of the main stream.

10. MELANOPLUS HERBACEUS.

(Plate X, fig. 10.)

Melanoplus herbaceus BRUNER!, Bull. Div. Ent. U. S. Dep. Agric., XXVIII (1893), pp. 25-26, fig. 13ab.—TOWNSEND, Ins. Life, VI (1893), p. 31.—BRUNER, Rep. St. Hort. Soc. Nebr., 1894, p. 163 (1894).

Grass green, more or less obscured with brownish olivaceous, almost the only markings being a broad dark green band extending from behind the eye across the prozona, directly beneath which the lateral lobes are often spotted with flavous; and, less frequently, a dusky green dorsal band from the posterior end of the fastigium across the prozona, occupying most of the disk and leaving between it and the lateral band only a narrow greenish flavous stripe on the lateral carinae. Head feebly prominent, the vertex gently tumid, the interspace between the eyes moderately broad, as broad as the frontal costa; the fastigium gently declivent and deeply and broadly sulcate; frontal costa percurrent, equal, sulcate throughout, deeply excepting above; eyes rather large, rather prominent, very much longer than broad; antennae a little longer than (male) or about two-thirds as

long as (female) the hind femora, ferruginous, more or less infuscated apically. Pronotum subequal on the prozona, the metazona expanding gently, the front margin subtruncate, the hind margin obtusely angulate, the angle well rounded, the disk gently convex, passing insensibly into the lateral lobes, the median carina slight on the metazona, indicated only by a pallid line on the prozona, the metazona closely and delicately punctate, the prozona a little longitudinal (male) or quadrate (female), slightly longer than the metazona. Prosternal spine long, conical, erect, blunt, a little shorter in the female than in the male; sternum sparsely punctate, the interval between the mesosternal lobes considerably more than twice (male) or fully twice (female) as long as broad, the metasternal lobes attingent over a considerable space (male) or approximate (female). Tegmina slender, gently tapering, well rounded at tip, surpassing considerably the tips of the hind femora, without markings; wings ample, pellucid, the veins and cross veins glaucous, more and more infuscated apically. Femora green, or more or less infuscated or embrowned, the hind pair rarely having the upper face infuscated with feeble, never distinct, fuscous clouds, the genicular arc more or less testaceous above; hind tibiae very faintly incurved, green becoming feebly flavescent apically, the spines rather short, pallid green, briefly black tipped, ten in number in the outer series. Extremity of the male abdomen subclavate, upturned, the supraanal plate subclypeate, narrowing gently in the basal, rapidly in the apical half, slightly constricted in the middle of the basal half, the apex rectangulate, the sides broadly and considerably elevated, the rest of the surface plane with a scarcely perceptible median sulcus, except apically where it is slight; furcula consisting of a pair of very large, broad, depressed plates, originating at the base of the last dorsal segment and reaching almost to the middle of the supraanal plate, subequal and attingent for half their length, beyond with their inner margin roundly excised, the apex obliquely and broadly truncate, so that the inner apical angle is acute; cerci rather small, rapidly narrowing on the basal half by the declivence of the upper margin, beyond equal, compressed-cylindrical, blunt tipped, straight, distinctly shorter than the supraanal plate and not greatly surpassing the last ventral segment; subgenital plate moderately narrow, subequal, the lateral margin straight, the apex not in the least elevated and but feebly prolonged, strongly rounded as viewed from above.

Length of body, male, 23 mm., female, 28.5 mm.; antennae, male, 13 mm., female, 9.5 mm.; tegmina, male, 21 mm., female 23.5 mm.; hind femora, male, 12 mm., female, 14.3 mm.

Seven males, eight females. El Paso, Texas, November (U.S.N.M.—Riley collection; L. Bruner); Albuquerque, Bernalillo County, New Mexico, August, Snow (University of Kansas); Las Cruces, Donna Ana County, New Mexico, October, ovipositing, T. D. A. Cockerell; Fort Grant, Graham County, Arizona (U.S.N.M.—Riley collection).

Bruner states that it also occurs "across the line in Mexican territory for some distance," and that it is confined to river bottoms, where it feeds on low vegetation, but is rarely seen on the ground.

11. MELANOPLUS FLAVESCENS, new species.

(Plate XI, fig. 1.)

Uniform pale flavous tinged with green, the upper part of the lateral lobes with a broad olivaceous band, extending from the eyes across the prozona and feebly marking the lateral carinae of the metazona. Head uniform in coloring and, except for the band mentioned, as light above as below; vertex gently tumid, the interspace between the eyes moderate, scarcely narrower than the frontal costa, the fastigium descending with the curvature of the vertex, rather deeply and broadly sulcate throughout; frontal costa prominent above, moderately broad, equal, pereurrent, deeply sulcate excepting above but with rounded margins, above seriatly punctate at the sides; eyes rather large and rather prominent; antennae almost as long as the hind femora (male), the first two joints flavous, the rest salmon red. Pronotum subequal, feebly enlarging at the metazona, the front margin feebly convex, the hind margin obtusely angulate, the angle rounded, the disk gently convex on the prozona with no lateral carinae, on the metazona plane with obscure rounded lateral carinae, the median carina distinct though slight on the metazona, wanting in front; prozona distinctly longitudinal, smooth, a third longer than the closely punctate metazona. Prosternal spine rather long, regularly conical, erect, blunt tipped; interspace between mesosternal lobes of male very slender, many times longer than broad, the metasternal lobes attingent over a wide space. Tegmina slender, very feebly tapering, well rounded apically, surpassing considerably the hind femora, greenish-yellow at base, nearly pellucid on apical half, without markings; wings pellucid with a scarcely perceptible glaucous tinge, the veins and cross veins fusco-glaucous. Fore and middle femora flavous with a tinge of olivaceous; hind femora golden yellow on the outer face, growing pallid below; elsewhere flavous with a distinct fulvous tinge on lower and inner sides, the genicular arc testaceous, stained with fuscous; hind tibiae glaucous, pallid at extreme base, the spines pallid on basal, black on apical half, ten in number in the outer series. Extremity of male abdomen feebly clavate, upturned, the supraanal plate obscurely clypeate, the lateral margins raised considerably throughout, pinched just before the middle and just before the tip, and so somewhat torqueate, the median sulcus only apparent and then slight in apical half; furcula consisting of a pair of large, broad, strongly depressed, longitudinally arcuate plates, which, measuring from the base of the last dorsal segment, are about twice as long as broad, in the basal half attingent, in their apical half strongly and roundly excised interiorly, apically obliquely and broadly truncate, terminating acutely at the inner hinder angle, and hardly reaching the

middle of the supraanal plate; cerci rather small, tapering in the basal three-fifths, gently and equally above and below, beyond equal, less than half as broad as the base, exteriorly sulcate apically, the tip blunt and not nearly reaching the tip of the supraanal plate; subgenital plate as in *M. herbaceus*.

Length of body, male, 25.5 mm.; antennae, 13? mm.; tegmina, 23 mm.; hind femora, 14 mm.

One male. San Diego, California, Coquillett (U.S.N.M. —Riley collection).

This species is very closely allied to the preceding, from which it differs by its color and pattern, by the differently shaped male cerci and furcula, by the extreme narrowness of the interspace between the mesosternal lobes, and by the less sharply margined frontal costa.

12. MELANOPLUS PICTUS, new species.

(Plate XI, fig. 2.)

Melanoplus pictus BRUNER!, MS.

A little above the medium size, highly variegated in coloring. Head slightly prominent, bright flavous, irregularly and profusely mottled and blotched with blackish fuscous, least and more delicately so above; vertex moderately tumid, raised slightly above the level of the pronotum, the interspace between the eyes narrow, narrower than the first joint of the antennae; fastigium rapidly and roundly declivent, distinctly sulcate throughout; frontal costa rather prominent above, subequal, considerably broader than the interspace between the eyes, just failing to reach the clypeus, distinctly sulcate excepting above, where it is biserially punctate; eyes rather large, long, and prominent, much longer than the infraocular portion of the genae; antennae nearly as long as the hind femora, flavous throughout. Pronotum subequal, enlarging a little on the metazona, the sides of the prozona a little tumid independently on each zone, the disk pilose, gently convex, passing by a rounded shoulder into the inferiorly vertical lateral lobes, the median carina distinct on the metazona, subobsolete on the prozona, obsolete between the sulci; front margin faintly convex with slight median emargination, hind margin obtusangulate, the angle well rounded; pronotum mostly brownish fuscous, irregularly enlivened by bright flavous, especially on the anterior part of the disk, on the uppermost part of the lateral lobes, and on the lower part of the metazona of the same, the brown deepening in color on the upper third or more of the prozona; prozona slightly longitudinal, scarcely longer than the densely punctate metazona. Prosternal spine rather short, stout, conical, blunt, erect; interspace between mesosternal lobes of male nearly three times as long as broad, the metasternal lobes subattinent. Tegmina long, slender, subequal, far surpassing the hind femora, brownish with a roseate tinge on the basal half, scarcely flecked with

paler maculations along the middle line; wings rather narrow, hyaline, the veins very pale blue, becoming infuscated apically and anteriorly. Legs flavous, banded with fuscous, the hind femora unequally trifasciate with blackish fuscous, the fasciation only distinct above, the outer face more or less olivaceous, the inner face sanguineous, and a postmedian sanguineous patch below, the genicular arc black, and the whole geniculation flecked with fuscous; hind tibiae purplish fuscous, marked with dull flavous between the spines, which are black, becoming pallid basally, flavous interiorly, eleven in number in the outer series. Extremity of male abdomen hardly clavate or recurved, the supraanal plate subclypeate, the margins strongly and roundly bent beyond the middle, the apex slightly produced, subrectangulate, and pointed, the sides strongly and broadly elevated in the proximal half, the median sulcus slight and only perceptible in apical half; furecula consisting of a pair of broad flattened plates slightly more than twice as long as broad, reaching to the middle of the supraanal plate, beyond the middle roundly and obliquely emarginate on the inner side, apically roundly and obliquely truncate exteriorly; cerci moderately broad at base, almost immediately tapering rapidly by the excision of the upper margin, so that the distal three-fourths forms a compressed subequal finger, barely expanding at the tip, the exterior surface slightly impressed or subsulcate apically, the whole straight, except for being slightly bent inward near the middle, failing to reach the tip of the supraanal plate; subgenital plate forming a regular well rounded flaring scoop, the margin nowhere elevated, entire, the plate considerably narrower apically than at base, and much longer than broad.

Length of body, male, 27 mm.; antennae, 12.5 mm.; tegmina, 24 mm.; hind femora, 14 mm.

One male. Bradshaw Mountain, Arizona, June 21 (L. Bruner).

13. MELANOPLUS BOWDITCHI.

(Plate XI, fig. 3.)

Melanoplus bowditchi SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), p. 72; Cent. Orth. (1879), p. 61.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 61; Publ. Nebr. Acad. Sc., III (1893), p. 27.—TOWNSEND, Ins. Life, VI (1893) p. 31.

Of medium size. Head slightly elevated, moderately arched above; interspace between the eyes about half as broad again as the first antennal joint, a little broader in the female than in the male; fastigium rather shallowly sulcate, subspatulate in form, the lateral margins thick and low; frontal costa equal, plane above, sulcate at and below the ocellus; eyes rather large, rather prominent, especially in the male. Pronotum simple, the metazona slightly expanding, punctulate, the median carina slight but distinct upon it, but wholly wanting in front; lateral carinae obsolete; transverse sulci of prozona distinct, subcontinuous across the middle. Tegmina very slender, extending beyond

(male) or fully to (female) the tip of the abdomen. Supraanal plate subquadrate, longer than broad, the lateral margins subparallel on basal half, beyond tapering rapidly, the tip triangularly produced, sharply angulated; plates of furcula stout, depressed, attingent at base, beyond with the inner margins separated at an angle of 45° , the outer margins straight and parallel, the extremity obliquely docked and scarcely incurved, more than half the length of the supraanal plate and nearly three times as long as the basal breadth; anal cerci forming long, slender, straight, compressed fingers, much expanded above at the extreme base, beyond scarcely tapering, bluntly and roundly terminated, directed backward, somewhat upward and a little inward, about as long as the first hind tarsal joint; subgenital plate elongated scoop-shaped, the extremity a little produced, entire; basal tooth of lower valve of ovipositor of female blunt, triangular, large, broader than long.

The general color is a grayish brown, the eyes margined above with dull pale-yellow, the face and genae olivaceous with transverse mottling; dusky ferruginous; antennae dull pale castaneous; behind the eye a broad piceous belt, sometimes broken, sometimes entire, crosses the prozona on the upper half of the lateral lobes; disk of pronotum brownish yellow, heavily punctate or mottled with fuscous. Tegmina with an obscure median series of alternate dusky and pallid spots; hind femora brownish yellow, more or less tinged with plumbeous, the incisures dusky, with faint indications on upper surface of dusky transverse stripes; hind tibiae bluish green, sometimes dotted with black and with black spines, ten in number in the outer series.

Length of body, male, 23 mm., female, 26 mm.; antennae, male, 10 mm.; tegmina, male and female, 20 mm.; hind femora, male, 13 mm., female, 14 mm.

Four males, 3 females. Lakin, Kearny County, Kansas, 3,000 feet, September 1; Pueblo, Colorado, 4,700 feet, August 30-31; Chaves, Bernalillo County, New Mexico, August 6 (L. Bruner); Las Cruces, Donna Ana County, New Mexico, July 8, T. D. A. Cockerell.

It is also reported by Townsend from Sabinal, Socorro County, and Belen, Valencia County, New Mexico, August 7.

14. MELANOPLUS FLAVIDUS.

(Plate XI, fig. 4.)

Melanoplus flavidus SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), p. 74; Cent. Orth. (1879), p. 63.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 61; Bull. Washb. Coll., I (1885), p. 38; *ibid.*, I (1886), p. 200; Publ. Neb. Acad. Sci., III (1893), p. 27.

Melanoplus cenchri McNEILL!, Psyche, VI (1891), pp. 74-75.

Moderately large in size. Head rather large, slightly elevated and well arched above; interspace between the eyes nearly (male) or quite (female) half as broad again as the first antennal joint; fastigium shall-

low, broad, subequal, the sides moderately narrow but low (male) or scarcely sulcate (female); frontal costa broad, equal, plane (male) or tumid (female) above, at and below the ocellus broadly and rather deeply sulcate; eyes pretty large but not very prominent. Pronotum with the prozona equal, the metazona expanding and punctato-rugulose; median carina slight but distinct on the metazona, obsolete or subobsolete on the prozona; lateral carinae subobsolete; transverse sulci of prozona slight but distinct, continuous. Tegmina extending a very little way beyond the abdomen, surpassing the hind femora. Supraanal plate regularly clypeate, about as broad as long; plates of the furcula shaped much as in *M. bowditchi*, but thickened at the tip, as long as the cerci or nearly two-thirds as long as the supraanal plate; the cerci have a triangular base and a long, straight, slender, bluntly terminated, equal finger extending backward and upward and ineined inward, starting from the lower posterior portion of the base; it is as long as the terminal joint of the hind tarsi; subgenital plate scoop-shaped, well rounded as viewed from above, the tip scarcely produced, entire.

The general color is greenish yellow, sometimes a little infuscated above, the head frequently mottled with fuscous; antennae uniform yellowish; the usual stripe behind the eye over the upper portion of the lateral lobes of the pronotum is generally reduced to a very narrow dusky stripe next or on the lateral carinae, diminishing in breadth posteriorly; or if it is broader, it sometimes invades the disk rather than the lateral lobes; the disk has a median dusky line and the summit of the head a dusky basal triangle. The tegmina partake of the general lively tone to a less extent, and the paler median stripe, distinct only at base, is seldom flecked intermittently with fuscous; hind femora yellow, the upper half of the outer face dusky, and two oblique dusky patches often occur above; hind tibiae glaucous, the spines white or glaucous, black tipped, ten to eleven in number in the outer series.

Length of body, male, 20.5 mm., female, 22 mm.; antennae, male, 13 mm., female, 9.75 mm.; tegmina, male, 20.5 mm., female, 22 mm.; hind femora, male, 14 mm., female, 15 mm.

Eighteen males, 20 females. Yellowstone, Montana, August (U.S.N.M.—Riley collection); Sidney, Cheyenne County, Nebraska, August (L. Bruner); Moline, Rock Island County, Illinois, August 27, J. McNeill; Denver, Arapahoe County, Colorado, October 5; Morrison, Jefferson County, Colorado, August 9; Colorado Springs, El Paso County, Colorado, August, E. S. Tucker (University of Kansas); Garden of the Gods, El Paso County, Colorado, October 6; Carrizo Springs, Dimmit County, Texas, August, Dr. A. Walgymar (U.S.N.M.—Riley collection); Las Cruces, Donna Ana County, New Mexico, July 8, T. D. A. Cockerell; Tucson, Pima County, Arizona (U.S.N.M.—Riley collection).

It is also reported by Bruner from Barber and Comanche counties, Kansas.

McNeill found it in Illinois only on high sandy ground where the sole vegetation was *Cenchrus*, and the grasshoppers were "colored so nearly like the yellow sand that they were difficult to see when only two or three feet away."

A single specimen from Colorado which apparently belongs here, but is too much injured to determine with certainty, has the hind tibiae pale red.

15. *MELANOPLUS ELONGATUS*, new species.

(Plate XI, fig. 5.)

Long and slender bodied, warm brownish fuscous, sometimes more or less ferruginous, with feeble markings. Head slightly prominent, dull plumbeo-flavous, much obscured with fuscous, especially above and in a band behind the eyes: vertex gently tumid, the interspace between the eyes rather narrow, narrower than (male) or rather broad, broader than (female) the frontal costa; fastigium descending with tolerable rapidity, broadly and deeply (male) or shallowly (female) sulcate throughout; frontal costa moderately broad, equal, deeply sulcate excepting above, where it is seriatly punctate next the margins; eyes tolerably large, not very prominent, rather elongate; antennae slightly shorter than (male) or about two-thirds as long as (female) the hind femora, fulvo-luteous, infuscated apically. Pronotum gently enlarging posteriorly, the front margin subtruncate, the hind margin somewhat obtusely angulate, the angle well rounded, the disk nearly plane, passing by a rounded angle into the inferiorly vertical lateral lobes, the median carina distinct though slight on the metazona, feebly perceptible on the prozona; lateral lobes marked above more or less obscurely with a broad fuscous stripe crossing the prozona, immediately below it sometimes enlivened with paler flecks; prozona feebly longitudinal (male) or feebly transverse (female), but little longer than the closely and finely punctate metazona. Prosternal spine long, erect, conico-cylindrical, blunt tipped; interspace between mesosternal lobes several times longer than broad, especially in the male, the metasternal lobes attingent in part (male) or approximate (female). Tegmina very long and slender, scarcely tapering, well rounded apically, feebly and very minutely flecked, extending far beyond the femoral tips; wings ample, pellucid, the veins and cross-veins blackish fuscous. Femora ferrugineo-testaceous, the hind pair more or less and irregularly clouded with fuscous, sometimes making a feeble, indistinct bifasciate barring, the genicular arc blackish testaceous; hind tibiae feebly incurved, glaucous, apically lutescent, pallid along the line of the spines, which are pallid at base, black apically, and nine to eleven, usually ten, in number in the outer series. Extremity of male abdomen a little clavate, upturned, the supraanal plate subelypate, with well rounded but feebly sinuate lateral margins, which are broadly and feebly raised, and hardly the least sign of a median sulcus; fureula consisting of a pair of large, very broad, much depressed, parallel plates, attingent at base, tapering and bluntly rounded at tip, reaching the middle of the supraanal plate.

the inner apical angle sometimes feebly asserting itself as in the allied species; cerci slender, not very long, incurved gently and a little upcurved, tapering gently in less than the basal half, beyond cylindrical, blunt tipped, reaching almost to the tip of the supraanal plate; subgenital plate moderately broad, subequal, the lateral margins straight but faintly rising at the apex, which is broadly rounded as seen from above.

Length of body, male, 29.5 mm., female, 30 mm.; antennae, male, 15 mm., female, 9.5 mm.; tegmina, male, 28 mm., female, 26.5 mm.; hind femora, male, 17 mm., female, 15 mm.

Five males, 4 females. Finney County, Kansas, September, H. W. Menke (University of Kansas); Las Cruces, Dona Ana County, New Mexico, July 8, T. D. A. Cockerell; Mexico (Museum Comparative Zoology); Lerdo, Durango, Mexico, November (L. Bruner); Guanajuato, Mexico, A. Dugès (U.S.N.M.—Riley collection); Bledos, San Luis Potosi, Mexico, October, E. Palmer.

This species differs from the two preceding by its slender elongate form, the simplicity of its male furcula, and by its general markings.

4. GLAUCIPES SERIES.

The two species placed together here have comparatively little in common to warrant their combination as a series, and each should perhaps be made the basis of a distinct series if other forms are found allied to one and the other; but falling together by the characters given in our table, I have thought it best for the present to connect them. They have these common characteristics:

The mesosternum in front of the lobes is plane in the male. The more or less maculate tegmina extend only to the tip of the hind femora, and the hind tibiae have from ten to twelve spines in the outer series. The supraanal plate is simple, without elevated sides; the furcula is developed as a pair of minute triangular denticles; the cerci are broad and short, only about twice as long as broad, a little upcurved, and apically broadly rounded, while the subgenital plate is moderately broad, prolonged, and scarcely elevated apically.

The species are of small or medium size; one occurs in Texas and northern Mexico, the other from Montana to Alaska.

16. MELANOPLUS GLAUCIPES.

(Plate XI, fig. 6.)

Caloptenus glaucipes SCUDDER!, Proc. Bost. Soc. Nat. Hist., XVII (1875), pp. 476-477; Ent. Notes, IV (1875), pp. 75-76.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 42.—SCUDDER!, Cent. Orth. (1879), pp. 20-21.

Melanoplus glaucipes SCUDDER!, Can. Ent., XII (1880), p. 75.

Wood-brown. Head and pronotum yellowish brown, heavily flecked with blackish, more heavily and minutely above, giving it a wood-brown

appearance; a broad black band extends from behind the eyes across the upper part of the lateral lobes of the pronotum, broadening on the metazona. Interspace between the eyes moderately narrow, scarcely wider than the first antennal joint; fastigium narrow, with sides broadening a little in front, pretty sharply defined, inclosing a moderately deep sulcus, deepest posteriorly; frontal costa rather broad, nearly equal, fading out below, with a scarcely perceptible sulcus excepting about the ocellus; antennae a little more (male) or much less (female) than three-fourths as long as the hind femora, orange red, paler at base. Pronotum subequal, the disk nearly plane, the front border truncate, the hind border obtusely angulate; median carina very slight, most distinct on the metazona, cut by all the transverse sulci; lateral carinae obsolete; prozona distinctly longitudinal, a third to a fourth longer than the metazona (male) or quadrate, only slightly longer than the metazona (female). Prosternal spine long, conical, bluntly tipped, somewhat retrorse, in the male considerably appressed; interspace between mesosternal lobes about twice as long as broad in both sexes, the metasternal lobes attingent (male) or approximate (female). Tegmina as long as the body, brown, with a few dusky flecks along the central field. Legs darker or lighter brownish yellow, flecked with fuscous, the hind femora bifasciate above with blackish, besides a blackish base and apex; hind tibiae glaucous with a pale annulus at the base, interrupted in the middle by a blackish glaucous ring, the spines pallid at base, black beyond, ten to twelve in number in the outer series. Extremity of male abdomen compressed, hardly clavate, upturned, the supraanal plate triangular with nearly straight sides, the surface subtectate, with a very deep and narrow percurrent median sulcus, bounded by sharp ridges; furcula consisting of a pair of basally attingent, minute, triangular denticulations, surmounting the ridges of the supraanal plate; cerci broad at base, scarcely twice as long as broad, subreniform, well rounded, but little smaller on the apical half, not so long as the supraanal plate; subgenital plate broader than long, neither elevated nor prolonged apically, but a little compressed, so that the thickened apical margin as seen from above is strongly rounded (the figure was, unfortunately, drawn from a specimen in which the extreme apex was slightly collapsed in drying) and subacuminate, extending far beyond the tip of the supraanal plate.

Length of body, male, 22.5 mm., female, 28 mm.; antennae, male and female, 9.5 mm.; tegmina, male, 16 mm., female, 18.75 mm.; hind femora, male, 12 mm., female, 15.5 mm.

Nine males, 12 females. Dallas, Texas, August 18, Boll (Museum Comparative Zoology; U.S.N.M.—Riley collection; S. H. Scudder); Lerdo, Durango, Mexico (L. Bruer).

17. MELANOPLUS KENNICOTTII.

(Plate XI, fig. 8.)

- Caloptenus bilituratus* SCUDDER!, Daws., Rep. Geol. Rec. 49th par. (1875), p. 343.
Melanoplus kennicottii SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1878), pp. 287, 289, 290; Ent. Notes, VI (1878), pp. 46, 48, 49.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 60; Rep. U. S. Ent., 1885 (1886), p. 307.
Melanoplus bilituratus CAULFIELD (pars), Rep. Ent. Soc. Ont., XVIII (1886), p. 171.
Caloptenus (Melanoplus) bilituratus CAULFIELD (pars), Can. Rec. Sc., II (1887), p. 401; (pars), Can. Orth. (1887), p. 13.
Melanoplus modestus BRUNER!, MS.

Brownish testaceous, heavily mottled with fuscous. Head very dark above and in a postocular band; vertex rather tumid, particularly in the male, where it is distinctly elevated above the level of the pronotum; interspace between the eyes rather broad, much broader than, in the female nearly twice as broad as, the basal joint of the antennae; fastigium rapidly declivent, broadly and rather deeply (male) or shallowly (female) sulcate throughout; frontal costa not very broad, slightly narrowed above, narrower than the interspace between the eyes; eyes moderately large and prominent; antennae testaceous, infuscated apically, a little shorter than (male) or less than two-thirds as long as (female) the hind femora. Pronotum short, enlarging a little posteriorly, the front border truncate, the hind border obtusely angulate, the angle rounded, dark testaceous above, more or less heavily mottled with fuscous, the lower portion of the lateral lobes lighter, but the upper part, on the prozona, with a broad piceous band, occasionally broken, especially in the female; median carina percurrent and slight, but feebler on the prozona than on the metazona; disk passing almost insensibly into the lateral lobes on the prozona, but on the metazona with a distinct though rounded angle; prozona feebly (male) or distinctly (female) transverse, scarcely longer than the obscurely punctate metazona. Prosternal spine short, erect, conical, very blunt; interspace between mesosternal lobes only a little longer than broad (male) or decidedly transverse, but narrower than the lobes themselves (female); metasternal lobes narrowly attingent (male) or approximate (female). Tegmina reaching, occasionally in the female surpassing, the tip of the hind femora, moderately narrow, distinctly tapering, brownish fuscous with feeble flecking along the discoidal area; wings moderately broad, hyaline, most of the veins and cross veins blackish fuscous. Hind femora brownish testaceous, more or less obliquely bifasciate with fuscous on the upper half, the genicular are piceous, the inferior face more or less but slightly fulvous; hind tibiae paler or browner testaceous, the spines black except at base, ten to eleven in number in the outer series. Extremity of male abdomen slightly clavate, upturned, the supraanal plate triangular with nearly straight sides and acutangulate apex, the median sulcus percurrent, not very narrow but mesially

constricted; furcula consisting of a pair of rather distant, minute, slender denticulations, lying outside the ridges bounding the sulcus of the supraanal plate; cerci coarse, punctate, hardly tapering, slightly upcurved, hardly twice as long as broad, the upper apical portion strongly compressed, while the rest is rather tumid, the apex rounded, reaching beyond the supraanal plate; subgenital plate broad and short, neither elevated nor prolonged apically, the apical margin narrowly subtruncate.

Length of body, male, 15 mm., female, 22.5 mm.; antennae, male, 6.5 mm., female, 6 mm.; tegmina, male, 11 mm., female, 13 mm.; hind femora, male, 8 mm., female, 10.5 mm.

Three males, 2 females. Yukon River, Alaska, Kennicott; Souris River, Assiniboia, Dawson; Glendive, Dawson County, Montana (L. Bruner); Custer County, Montana (same).

Bruner states that this insect feeds upon sagebrush, though it is uncertain whether this is the species he refers to in his statement, since the specimens received from him bear another name.

5. UTAHENSIS SERIES.

In this small group the prozona of the male is quadrate or subquadrate, and the interspace between the mesosternal lobes is as in the spretus series; in front of these lobes, also, the mesosternum of the male has a central swelling forming a blunt tubercle. The antennae are rather short and differ but little in the two sexes. The tegmina are fully developed, but rather short, surpassing the hind femora but little if at all, and clear or feebly maculate; the hind tibiae are red, with normally eleven spines in the outer series.

The supraanal plate is rudely clypeate and longer than broad; the furcula well developed, consisting of flattened, parallel, more or less tapering fingers, half as long as the supraanal plate; the cerci are laminate and simple, very broad and short, subequal, broadly rounded apically, a little upcurved; the subgenital plate is peculiar, being exceptionally long and exceptionally broad, exceptionally elevated and prolonged at apex, the apical margin strongly rounded and mesially entire, though in one species laterally notched, an exceedingly exceptional feature.

The species, three in number, vary from a little below the medium to rather large sized. They are found mainly in the Cordilleran region from about latitude 38° northward into Canada.

18. MELANOPLUS BRUNERI, new species.

(Plate XI, fig. 7.)

Melanoplus extremus? BRUNER!, Can. Ent., XVII (1885), p. 18.

Brownish fuscous, often with a ferruginous tint. Head pale olivaceous-testaceous, dark fuscous or ferruginous above, often much infumated or mottled with fuscous below and with a piceous stripe behind the eyes; vertex feebly tumid, scarcely raised above the level of the pronotum;

interspace between the eyes rather broad, as broad as (male) or broader than (female) the first antennal joint; fastigium rapidly descending with a regular curve, broadly and very shallowly sulcate (male) or plane with feebly raised margins between the eyes (female); frontal costa broad, as broad as the interspace between the eyes, equal, or feebly narrower above than below, just failing to reach the clypeal margin, feebly impressed at and sometimes a little below the ocellus, punctate especially at the sides; eyes moderate, as long as the infraocular portion of the genae, not very prominent; antennae varying from fulvo-testaceous to rufous, much infuscated apically, about three-fourths as long as the hind femora, nearly as long in the female as in the male. Pronotum with the front margin transverse, the hind margin obtusely angulate, the angle rounded, the median carina percurrent, but feeble on the prozona, the prozona plano-convex, passing by a well-rounded angle into the subvertical lateral lobes, the disk smooth, quadrate (male) or feebly transverse (female), slightly longer than the finely and densely punctate metazona, the transverse sulci distinct and continuous; the upper two-fifths of the lateral lobes are marked on the prozona by a fuscous or piceous patch, while the lower half is occasionally lighter than the rest of the body. Prosternal spine erect, and moderately long, appressed conical, the tip blunt (male) or short, stout, conico-cylindrical, very blunt (female); interspace between mesosternal lobes more than twice as long as broad (male) or subquadrate (female); metasternal lobes attingent (male) or distant by half the width of the frontal costa (female). Tegmina reaching and generally somewhat surpassing the tips of the hind femora, somewhat but rather delicately maculate in the basal two-thirds of the discoidal area; wings pellucid, rather broad. Hind femora fusco-ferruginous, obliquely blotched externally and above with luteo-testaceous, the lighter parts occurring before and past the middle and as a pregenicular annulus; beneath dull luteous with a tinge of fulvous; genicular arc fusco-piceous; inferior genicular lobe pallid or sordid luteous with a basal black bar; hind tibiae pale red, sometimes with a pale greenish yellow tinge, sometimes with a feeble fuscous patellar mark, the spines black excepting at base, ten to twelve, usually eleven, in number in the outer series. Extremity of the male abdomen a little clavate, much upturned, the supraanal plate rather narrow, demi-oval, with rounded sides and scarcely angulate apex, the rather deep median sulcus terminating beyond the middle by the contraction of its rather stout lateral walls, each lateral half of the plate with a short apical ridge in its middle; furcula consisting of a pair of straight, parallel, flattened, rather slender, tapering, pointed, basally attingent fingers, reaching the middle of the supraanal plate; cerci broad, subequal but mesially contracted, compressed, slightly upcurved and incurved laminae, bluntly rounded apically, more than twice as long as broad, shorter than the supraanal plate; infracercal plates broad, obliquely truncate apically, scarcely surpassing the supraanal plate; subgenital plate greatly prolonged and elevated apically, the

apical face depressed so as to give a tendency to the margin to appear bilobed in drying, but the apical margin actually entire, subtruncate.

Length of body, male, 22 mm., female 22.5 mm.; antennae, male, 9.5 mm., female, 8.5 mm.; tegmina, male, 19 mm., female, 18.75 mm.; hind femora, male and female, 12.5 mm.

Twenty-three males, 25 females. Camp Umatilla, Washington, June 26 (Museum Comparative Zoology); Brown's, Colville Valley, Washington, July 24 (same); Loon Lake, Colville Valley, Washington, July 23 (same); Little Spokane, Washington, July 26 (same); Fort McLeod, Alberta, Canada, August (L. Bruner; U.S.N.M.—Riley collection); Banff, Alberta, Bean, June, August (S. Henshaw); Montana (U.S.N.M.—Riley collection); Weeksville, Montana, August 2 (Museum Comparative Zoology); Yellowstone, Montana, August (U.S.N.M.—Riley collection); Gordon, Sheridan County, Nebraska, Bruner (same); South Park, Colorado, 8,000 to 10,000 feet; Florissant, El Paso County, Colorado, August 17–22, 8,000 feet.

Specimens from Colorado and Nebraska are a little smaller than those from further north, and have rather shorter wings. The same is true also of specimens taken at Banff, Alberta, in June.

Bruner also reports it from Helena, Fort Ellis, and the Madison valley, Montana, and Salmon City, Idaho.

19. *MELANOPLUS EXCELSUS*, new species..

(Plate XI, fig. 9.)

Dull brownish fuscous, the under surface dull luteo-testaceous. Head dark above and in a piceous band behind the eyes, but elsewhere dull flavo-olivaceous, more or less clouded with plumbeous; vertex feebly tumid, raised slightly above the level of the pronotum in the male; interspace between the eyes rather broader than (male) or nearly twice as broad as (male) the basal antennal joint; fastigium plane with a basal transverse impression (female) or broadly and shallowly sulcate throughout (male); frontal costa broad, broader than the interspace between the eyes, feebly narrowing above in the male, scarcely depressed at the ocellus, and sometimes in the male slightly below it, just failing to reach the clypeus, sparsely punctate; eyes moderately long, anteriorly truncate, as long as the infraocular portion of the genae, slightly prominent; antennae less than three-fourths (male) or than two thirds (female) as long as the hind femora, fusco-ferruginous, lighter at base. Pronotum gradually and slightly enlarging posteriorly, with the front margin truncate, the hind margin bluntly obtusangulate, the brownish fuscous base with a dull flavous tinge, which increases on the lateral lobes except in the upper portion of the prozona, which is mostly piceous, the sulci piceous, followed in the posterior section by a small flavous patch; median carina percurrent, black, sharper and more elevated on the mesazona than on the prozona, the prozona plano-convex with broadly rounded lateral carinae, slightly more angulate on the metazona; disk of prozona nearly smooth and quadrate

(male) or feebly transverse (female), no longer than the feebly and finely ruguloso-punctate metazona. Prosternal spine moderately long and slender, conico-cylindrical, blunt (male) or short and stout, appressed conical, very blunt (female); interspace between mesosternal lobes much less than twice as long as broad (male) or transverse (female), the metasternal lobes attingent (male) or approximate (female). Tegmina just reaching as far as the hind femora, rather slender, scarcely tapering, distinctly and quadrately maculate in all but the apical fourth of the discoidal area; wings pellucid, not very broad. Hind femora obliquely marked alternately with blackish fuscous and brownish testaceous, showing most distinctly (and sometimes only) on the upper half, the lower half lighter, beneath red, in the female sometimes paler, the genicular arc piceous; hind tibiae bright red with a fuscous patellar spot, the spines black except at their very base, ten to twelve (usually eleven) in number in the outer series. Extremity of male abdomen clavate, considerably upturned, the supraanal plate narrow, the sides subparallel and broadly upturned over a little more than the basal half, beyond triangular with rectangular apex, the median sulcus very deep and narrow between high and compressed walls, reaching nearly to the tip, so that each side has between these walls and the elevated margins of the plate a very pronounced sulcation; furcula consisting of a pair of strongly depressed, slender, parallel fingers, equal and scarcely parted in basal half, beyond tapering and bluntly pointed, reaching the middle of the supraanal plate; cerci very broad, subequal in basal half, then bent a little upward and feebly tapering but broadly rounded apically, the whole obliquely vertical, straight and not incurved, less than twice as long as broad, and shorter than the supraanal plate; infracercal plates thickened apically and a little surpassing the supraanal plate, obliquely truncate; subgenital plate greatly prolonged and elevated apically, the apical margin entire, well rounded, in no way truncate.

Length of body, male, 20 mm., female, 22 mm.; antennae, male, 7.5 mm., female, 7 mm.; tegmina, male, 16 mm., female, 15 mm.; hind femora, male, 11.5 mm., female, 13 mm.

Four males, 5 females. Above timber, 11,000 to 13,000 feet, on Mount Lincoln, Park County, Colorado, August 13.

20. *MELANOPLUS UTAHENSIS*, new species.

(Plate XI, fig. 10.)

Melanoplus utahensis BRUNER!, MS.

Yellowish brown. Head luteous, much clouded with light fusco-olivaceous, the summit and a broad band behind the eyes very dark fusco-olivaceous, separated by a luteous stripe; vertex gently tumid, scarcely elevated above the pronotum, the interspace between the eyes broad, fully as broad as the first antennal joint, the fastigium broadly and shallowly sulcate except at base; frontal costa broad, feebly

narrowed above the ocellus, as broad as the interspace between the eyes, feebly depressed at the ocellus, punctate throughout; eyes rather large, not very prominent, as long as the infraocular portion of the genae; antennae testaceous. Pronotum gently widening posteriorly, the front margin scarcely convex and feebly and roundly emarginate in the middle, the hind margin obtusely angulate, the angle rounded, the median carina distinct and rather sharp on the metazona, feeble on the prozona and obsolete between the sulci; disk of prozona plano-convex, passing almost insensibly but with a broadly rounded angle into the subvertical lateral lobes, the lateral carinae feebly indicated on the metazona; mesial half of the disk of the prozona very dark fusco-olivaceous, bordered on either side by luteous; lateral lobes and metazona luteo-testaceous with an olivaceous tinge, the upper half of the lateral lobes of the prozona occupied by a broad fusco-fuliginous glistening band, failing to reach the anterior border and broader on the posterior than on the anterior section; prozona smooth, quadrate, a very little longer than the closely punctate metazona. Prosternal spine long, slightly appressed cylindrical, blunt-tipped, very feebly retrorse; interspace between mesosternal lobes of male about half as long again as broad, the metasternal lobes attingent. Tegmina scarcely attaining the tips of the hind femora, moderately broad at base, distinctly tapering, the tip narrow and strongly rounded, brownish testaceous without markings; wings pellucid, the main veins testaceous, the others blackish fuscous. Femora yellowish brown, the hind pair much infuscated on the outer face, especially above, the upper surface broadly marked with fuscous near base at tip, and with two other nearly confluent belts between, the inner face feebly and the lower face distinctly reddened; genicular are black; hind tibiae uniformly red, the spines black nearly to the base, eleven in number in the outer series. Extremity of male abdomen broadly clavate, strongly upturned, the supraanal plate rather long, triangular, with rounded sides, acutangulate apex, the basal two-thirds of the lateral margins broadly elevated, the median sulcus narrow and deep, extending over two-thirds of the plate, bounded by moderate walls; furcula consisting of a pair of very broad, parallel, elongated, strongly flattened pads with rounded tips, almost reaching the middle of the supraanal plate, their outer margins broadly rounded; cerci consisting of coarse and broad, punctate laminae, feebly narrowing in the basal half, beyond a little upturned, equal, very broadly rounded at apex, straight or feebly outcurved apically, not so long as the supraanal plate; infracercal plates visible only at extreme base; subgenital plate enormously produced and elevated (more abruptly elevated than represented in the figure), the apical margin deeply emarginate laterally, and well rounded and entire mesially.

Length of body, male, 27 mm., tegmina, 18 mm.; hind femora, 14 mm.

One male. Salt Lake, Utah, August 30, L. Bruner (U.S.N.M.—Riley collection).

6. SPRETUS SERIES.

This group is a very homogeneous one and comprises the species of *Melanoplus* which are especially destructive to vegetation by their immense numbers and more or less extended flights, such destructiveness being almost confined to its members. The pronotum of the male is transverse or quadrate or feebly longitudinal, and the interspace between the mesosternal lobes in the same sex varies from a little longer than broad to fully twice as long as broad, the mesosternum in front of the lobes centrally elevated to form a very low and blunt conical tubercle or boss. The tegmina are always fully developed, usually much surpassing the tips of the hind femora (though in one case not nearly reaching them), more or less maculate (only immaculate by individual exception), and the hind tibiae are variably colored, but either red or green (very rarely blue or yellow), and have nine to thirteen spines in the outer series.

The supraanal plate of the male is subtriangular, rather long, with straight or sinuous lateral margins; the furcula consists of a pair of slender, tapering, parallel or divergent, generally feebly depressed fingers, generally extending over the basal fourth of the supraanal plate; the cerci are rather broad and nearly straight and nearly flat lamellae, the apical half narrower than the basal, generally through oblique excision of the lower margin, and usually bent upward a little, rounded or subtruncate at tip and from one and a half to three times as long as broad; the subgenital plate is haustrate, about as broad as long, more or less elevated apically and has the apical margin mesially notched.

The species, seven in number, are of a medium or moderately large size and range widely (especially *M. atlantis*, the range of which is almost or quite equal to that of the group), occurring in every part of the United States, from Atlantic to Pacific, excepting most of California and the southernmost of the Atlantic States; members of the group occur also, but apparently in scanty numbers, as far beyond our southern borders as Central Mexico, and on the north, in full abundance, in Canada from ocean to ocean; but this group apparently does not extend so far north as the femur rubrum series, for it is not known from Newfoundland or Labrador, nor about Hudson Bay, though in the west it reaches the Arctic Circle, two of the species occurring in Alaska.

21. MELANOPLUS ALASKANUS, new species.

(Plate XII, fig. 1.)

Slightly above the medium size, ferrugineo-fuscous with testaceous markings. Head pale castaneous, heavily marked above, at least in the male, with black, especially along the margins of the eyes and in a median stripe, besides a broad postocular band; vertex gently tumid,

scarcely elevated above the pronotum, the interspace between the eyes half as broad again (male) or fully twice as broad (female) as the first antennal joint; fastigium somewhat strongly declivent, broadly and rather deeply (male) or shallowly (female) sulcate; frontal costa rather prominent, percurrent, feebly narrowed above, as broad as the interspace between the eyes, finely and irregularly punctate throughout, but more sparingly below than above, sulcate at and a little below the ocellus; eyes moderately large, moderately prominent, longer than the infraocular portion of the genae; antennae rufo-testaceous, about three-fourths (male) or less than three-fifths (female) as long as the hind femora. Pronotum subequal, expanding feebly on the metazona, luteo-castaneous, the metazona and especially its disk rufo-castaneous, the lateral lobes of the prozona with a very broad piceous postocular band; disk of pronotum very broadly convex, passing by a rounded but distinct shoulder, on the metazona forming subdistinct lateral carinae, into the anteriorly tumid vertical lateral lobes; median carina percurrent, but on the prozona rather feeble and uniform; front margin truncate, narrowly submarginate, hind margin obtusangulate; prozona longitudinally quadrate (male) or feebly transverse (female), as long as the feebly ruguloso-punctate metazona. Prosternal spine short, stout, appressed cylindrical, very obtuse; interspace between mesosternal lobes more than twice as long as broad, broadening posteriorly (male) or subquadrate (female). Tegmina somewhat surpassing the tips of the hind femora, moderately broad, distinctly tapering, rufo-fuscous, feebly maculate with black along the middle line. Fore and middle femora of male rather strongly tumid; hind femora pale flavo-testaceous, flecked with black in open transverse fasciations on the upper half, at base, just before, and somewhat behind the middle, the geniculation with the base of the lower genicular lobe black, the outer half of the anterior face roseate; hind tibiae dark or light red with a feeble fuscous patellar spot, the spines black beyond the base, ten to twelve, usually eleven, in number in the outer series. Extremity of male abdomen clavate, strongly recurved, the supraanal plate triangular with rather broad and subclepsydral median sulcus, bounded by not strongly elevated rounded walls; furcula consisting of a pair of rather coarse, parallel, basally attingent, tapering, acuminate, flattened fingers, a third as long as the supraanal plate; cerci subfalcate, tapering more rapidly in basal than in apical half, regularly curved upward, compressed, strongly rounded apically, more than twice as long as median breadth; subgenital plate pyramidal and strongly elevated apically, the apical margin much thickened but notched by a deep mesial contraction, which separates two rounded bosses.

Length of body, male, 22 mm., female, 26 mm.; antennae, male (est.), 9 mm., female, 8 mm.; tegmina, male, 18 mm., female, 20 mm.; hind femora, male, 12.5 mm., female, 14.5 mm.

Two males, 1 female. Alaska, T. C. Mendenhall (U.S.N.M.); Spilmacheen, British Columbia, July 25 (S. Henshaw).

22. MELANOPLUS AFFINIS, new species.

(Plate XII, fig. 2.)

Melanoplus affinis BRUNER¹, MS.[Some of the synonymy given under *M. atlantis* almost certainly belongs here.]

Slightly above the medium size, rather robust, griseo-fuscous, testaceous beneath. Head olivaceo-plumbeous, the clypeus and labrum paler, above more or less rufous and marked with fuscous, with a piceous postocular band; vertex gently tumid, slightly elevated above the pronotum, the interspace between the eyes half as broad again (male) or fully twice as broad (female) as the first antennal joint; fastigium very steeply declivent, broadly and considerably (male) or feebly (female) sulcate; frontal costa reaching or almost reaching the clypeus, as broad as the interspace between the eyes, feebly narrowed above at least in the male, irregularly sulcate throughout but more densely above than below, feebly sulcate or reticulate slightly below the ocellus; eyes moderately large, not very prominent, much longer than the infraocular portion of the genae; antennae flavo-testaceous, about three-fourths (male) or about two-thirds (female) as long as the hind femora. Pronotum subequal, expanding a little on the metazona, darker above than on the sides, the lateral lobes of the prozona with a more or less distinct, sometimes broken, broad, piceous, postocular band, the disk nearly plane but broadly convex, passing into the subvertical lateral lobes by a well-rounded but distinct shoulder, forming tolerably distinct lateral carinae on the metazona; median carina percurrent, distinctly feebler on the prozona than on the metazona, as distinct between the sulci as in advance of them; front margin very feebly and very narrowly flaring, truncate, hind margin obtusangulate, the angle not much rounded; prozona feebly longitudinal or quadrate (male) or somewhat transverse (female), scarcely if any longer (male) or faintly shorter (female) than the densely but somewhat obscurely punctate metazona. Prosternal spine moderately long, cylindrical, erect, very blunt and faintly appressed in the male, similar but shorter and more conical in the female; interspace between mesosternal lobes twice or more than twice as long as broad (male) or subquadrate (female). Tegmina surpassing considerably the hind femora, moderately narrow, tapering feebly, rufo-fuscous or griseo-fuscous, with a distinct but more or less pronounced median series of fuscous annulations intercalated in basal half between more or less pronounced pallid dashes or spots; wings hyaline, the veins heavily infuscated apically and anteriorly. Fore and middle femora of male moderately tumid; hind femora rufo-testaceous, more or less clouded with fuscous and feebly bifasciate with fuscous above, the lower face and at least the lower half of the inner face roseate, the genicular arc black; hind tibiae pale glaucous, flavescens at apex and with a fuscous patellar spot, the spines black on more than the apical half, often, occasionally twelve, in number in the outer series. Terebrator of male abdomen

a little clavate, somewhat recurved, the supraanal plate triangular with slightly convex and slightly elevated lateral margins, subrectangulate apex, and a rather narrow and not very deep pereurrent median sulcus, bordered by narrow but rather low and rounded walls; furcula consisting of a pair of very slender, feebly divergent, tapering, acuminate spines, scarcely a fourth as long as the supraanal plate; cerci consisting of a feebly tapering, feebly tumid basal half, and a subequal, slenderer, compressed apical half, the latter bent feebly inward and slightly upward, rounded apically, the whole a little more than twice as long as median breadth; subgenital plate with the apical margin feebly elevated, thickened and mesially notched, but not deeply.

Length of body, male, 23 mm., female, 26 mm.; antennae, male, 8.5 mm., female, 9 mm.; tegmina, male, 20 mm., female, 22.5 mm.; hind femora, male, 12.25 mm., female, 14 mm.

Six males, 4 females. Salt Lake Valley, Utah, August 30 (L. Bruner); Fort McKinney, Johnson County, Wyoming, July (same); Olmstead's, near Ellensburg, Kittitas County, Washington, July 14, 15, S. Henshaw (Museum Comparative Zoology); Ellensburg, Kittitas County, Washington, July 14, Henshaw (same); Spokane, Washington, July 21, 22, Henshaw (same); Loon Lake, Colville Valley, Washington, July 25, Henshaw (same); Camp Umatilla, Washington, June 27, Henshaw (same); British Columbia, Crotch (same).

Bruner in an unpublished account of this species gives its habitat as "in the mountains near Ogden, Utah, among the low trees and bushes, at an elevation slightly above the highest of the ancient shore lines of Salt Lake; also among the foothills of the Big Horn Mountains, near Fort McKinney, Wyoming."

In the same manuscript, Bruner compares the present species with *M. atlansis*, as follows:

Closely related to *M. atlansis* in many respects; from which it is to be distinguished by its somewhat larger size and more robust form, also by its larger head and more prominent eyes. The last ventral segment [subgenital plate] of the male is shorter and the male cerci are narrower than in the typical *atlansis*. The color of the hind tibiae is pale glaucous as in *intermedius* instead of red, as is usually the case in typical specimens of *atlansis*.

23. MELANOPLUS INTERMEDIUS, new species.

(Plate XII, figs. 3, 4.)

Melanoplus intermedius BRUNER!, MS.

[Some of the synonymy given under *M. atlansis* almost certainly belongs here.]

A medium-sized or rather small species, of slender form, brownish fuscous, dull testaceous beneath. Head slightly prominent, rufous or fuscotestaceous, more or less heavily flecked with fuscous above, or wholly infuscated, with a broad piceous or fuscous postocular band; vertex gently tumid, a little (sometimes considerably) elevated above the level of the pronotum, the interspace between the eyes fully half as broad again as the first antennal joint, slightly broader in the female than in

the male; fastigium rather steeply declivent, distinctly (male) or shallowly (female) and broadly sulcate; frontal costa rather prominent, percurrent or almost percurrent, equal, as broad as (female) or slightly broader than (male) the interspace between the eyes, biserially punctate throughout, slightly depressed at and just below the ocellus; eyes moderately large, prominent especially in the male, much longer than the infraocular portion of the genae; antennae fulvous, basally lutescent, four-fifths (male) or less than three-fifths (female) as long as the hind femora. Pronotum subequal but for the gently flaring metazona, more or less infuscated, sometimes punctate or strigose with fuscous, with a generally distinct postocular piceous band on the lateral lobes of the prozona, the disk very broadly convex and passing into the subvertical lateral lobes by a broadly rounded but distinct shoulder, occasionally angulate on the metazona; median carina distinct on the metazona, feeble on the prozona, nearly always (especially in the male) subobsolete between the sulci; front margin truncate or subtruncate, hind margin obtusangulate, the angle little rounded; prozona feebly longitudinal or rarely quadrate (male) or more or less distinctly transverse (female), generally and especially in the male a little longer than the finely punctate metazona. Prosternal spine moderately long, erect, cylindrical, blunt, in the female tapering a little as seen from the front; interspace between mesosternal lobes twice as long as broad (male) or a little longer than broad (female). Tegmina reaching or somewhat surpassing the tips of the hind femora, rather slender, tapering with some distinctness, apically narrow, brownish fuscous, apically fusco-hyaline, the middle third or more of the discoidal area more or less feebly and rather minutely flecked with fuscous; wings moderately broad, hyaline, with blackish fuscous veins. Fore and middle femora of male not very tumid (the middle more than the fore femora), the hind femora flavo-testaceous, very obliquely and rather broadly bifasciate with fuscous, which sometimes suffuses nearly the whole upper half, the lower face sometimes very feebly roseate, the genicular are black, the lower genicular lobe usually pallid throughout; hind tibiae pale glaucous, rarely red, the spines black nearly to their base, ten to twelve in number in the outer series. Extremity of male abdomen feebly clavate, gently recurved, the supraanal plate triangular with feebly convex lateral margins, subrectangulate apex, and a narrow percurrent median sulcus between rather high and sharp walls; furcula consisting of a pair of feebly divergent, slender, tapering and acuminate, slightly depressed spines about a fourth the length of the supraanal plate; cerci rather small, a little more than twice as long as broad, gently tapering and externally a little tumid in the basal half, beyond subequal, compressed or subsulcate, gently upturned, apically subtruncate or broadly rounded; subgenital plate very slightly elevated apically, the margin feebly notched.

Length of body, male, 18 mm., female, 22 mm.; antennae, male, 8.25

mm., female, 6.5 mm.; tegmina, male, 13 mm., female, 13.5 mm.; hind femora, male, 10 mm., female, 11.5 mm.

Fifteen males, 23 females. White River, Rio Blanco County, Colorado, July 24–August 14; Yellowstone, Montana, August (U.S.N.M.—Riley collection; L. Bruner); Yellowstone National Park, September 6–12; Salmon City, Lemhi County, Idaho, August (U.S.N.M.—Riley collection); Washington, Morrison (same.)

Mr. Bruner, in an unpublished account of this species kindly placed in my hands, says that the point in Montana where this species was taken is in the Yellowstone Valley above the mouth of the Big Horn River; and he gives the following points of difference between this species and *M. atlanis*:

In *intermedius* the entire body is more or less covered with rather long fine hairs, the thorax is much longer than in *atlanis*—throwing the base of the posterior femora considerably back of the middle—and in this respect resembling *Pezotettix* [*Melanoplus*] *washingtonianus* Bruner. The male cerci are longer and narrower than in *atlanis*, and are curved slightly inward and upward on the apical half; they are also shallowly grooved from the outside. The last ventral segment [subgenital plate] of the male abdomen is a little shorter than in that species, and the prosternal spine is also much longer, stouter, and more bluntly pointed than there. The general colorization is much the same as in *atlanis* but darker—being dull brown and gray above and dingy beneath; there are no well-defined bands upon the posterior femora, and the tibiae are dull glaucous, more or less tinged with brown, especially on the basal third and near the apex.

It differs from *M. atlanis*, to which it is most nearly allied, in the longer male antennae, the weaker median carina of the pronotum, the more heavily marked hind femora, and its smaller and slenderer form.

24. MELANOPLUS BILITURATUS.

(Plate XII, fig. 5.)

Caloptenus bilituratus WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 679.—

THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 160; Rep. U. S. Ent. Comm., I (1878), p. 43.—PACKARD, *Ibid.*, I (1878) p. [143].—SCUDDER, Proc.

Bost. Soc. Nat. Hist., XIX (1878), p. 289; Ent. Notes, VI (1878), p. 48.

Melanoplus bilituratus CAULFIELD (pars), Rep. Ent. Soc. Ont., XVIII (1886), p. 71.

Caloptenus (*Melanoplus*) *bilituratus* CAULFIELD (pars), Can. Rec. Sc., II (1887), p. 401; (pars), Can. Orth. (1887), p. 13.

? *Melanoplus scriptus* COCKERELL, Trans. Am. Ent. Soc., XX (1894), p. 337.

[Some of the synonymy given under *M. atlanis* almost certainly belongs here.]

A little above the medium size, rather robust, griseo-fuscous. Head a little prominent, fusco-testaceous or fusco-plumbeous, generally more or less infuscated above in longitudinal streaks and with a postocular piceous band; vertex somewhat tumid, a little elevated above the pronotum, the interspace between the eyes half as broad again as the first antennal joint, or slightly broader than that in the female; fastigium steeply declivent, sulcate throughout, more deeply in the male than in the female; frontal costa failing to reach the clypeus, slightly narrowed above but fully as broad as the interspace between the eyes, feebly sulcate at and below the ocellus, feebly and more or less biserially punctate throughout; eyes pretty large, rather prominent, distinctly longer

than the infraocular portion of the genae; antennae testaceous, about two-thirds (male) or rather more than three-fifths (female) as long as the hind femora. Pronotum subequal on the prozona, expanding posteriorly on the metazona, darker above than on the sides, but occasionally with pale stripes following the inner margin of the lateral carinae, the lateral lobes with a generally maculate or broken but usually conspicuous piceous postocular band confined to the prozona, the disk plane on the metazona, feebly convex on the prozona, passing abruptly into the vertical lateral lobes by a distinct shoulder, on the metazona forming rather definite lateral carinae; median carina distinct on the metazona, subdued and uniform on the prozona, more nearly obsolete in the female than in the male; front margin truncate, hind margin feebly obtusangulate; prozona quadrate or feebly longitudinal (male) or transversely subquadrate or transverse (female), scarcely or not longer than the densely punctate metazona. Prosternal spine not very stout, stouter in the female than in the male, appressed conical, rather blunt, erect; interspace between mesosternal lobes fully twice as long as broad (male), or subquadrate (female). Tegmina generally surpassing a little, sometimes considerably, the hind femora, moderately slender, tapering but little, well rounded apically, brownish fuscous, variably maculate but generally rather heavily marked along the discoidal area, sometimes sprinkled with fuscous over a large part of the tegmina, rarely reduced to a feeble series of spots along the middle line; wings rather broad, hyaline with fuscous veins. Fore and middle femora somewhat tumid in the male; hind femora testaceous or flavo-testaceous, heavily and obliquely (and more or less distinctly) bifasciate with fuscous or blackish fuscous over the upper and outer faces, the geniculation black, often with an indistinct pregenicular pale flavous annulation, the lower face with a flush of roseate; hind tibiae bright red (by rare exception glaucous) with a more or less distinct fuscous patellar spot, the spines black almost to the base, eleven to thirteen, usually eleven, in number in the outer series. Extremity of male abdomen considerably clavate, well recurved, the supraanal plate long triangular, feebly compressed in the middle, the apex acutangulate, the margins elevated, the median sulcus rather heavy and deep, apically evanescent, its walls stout; furcula consisting of a pair of parallel, tapering, flattened fingers about a third as long as the supraanal plate; cerci nearly three times as long as middle breadth, consisting of a feebly tapering basal portion nearly twice as long as broad, and an apical, slightly inbent and feebly upturned, externally broadly sulcate, subequal portion, well rounded at tip; subgenital plate subpyramidal, with its lateral margins very feebly sinuate, the apical margin rising a little higher and distinctly notched as well as laterally tumid.

Length of body, male, 21 mm., female, 26.5 mm.; antennae, male, 9 mm., female, 8.75 mm.; tegmina, male, 18.5 mm., female, 20 mm.; hind femora, male, 13 mm., female, 14 mm.

Forty-eight males, 71 females. British Columbia, G. W. Taylor (L

Bruner); same, G. R. Crotch; Vancouver Island, British Columbia, H. Edwards (S. H. Scudder; U.S.N.M.—Riley collection); Victoria, Vancouver Island, British Columbia, Packard (same); Gold Stream, Vancouver Island, British Columbia, July 17 (S. Henshaw); Sicamous, British Columbia, July 25 (same); Northwest Boundary Survey, Doctor Kennerly; Washington, Morrison (U. S. N. M.—Riley collection); S. Henshaw); Camp Umatilla, Washington, June 26, Henshaw (Museum Comparative Zoology); Loon Lake, Stevens County, Washington, July 25, Henshaw (same); Brown's, Colville Valley, Washington, July 24, Henshaw (same); Ellensburg, Kittitas County, Washington, July 14, Henshaw (same); Easton, Kittitas County, Washington (U.S.N.M.—Riley collection); Spokane, Washington, July 21, 22, Henshaw (Museum Comparative Zoology); Fort Wallawalla, Washington Bendire (U. S. N. M.—Riley collection); Wallula, Wallawalla County, Washington, September 1, Packard (same; S. H. Scudder); Morgan's Ferry, Yakima River, Washington, July 1, Henshaw (Museum Comparative Zoology); La. Chapples, Yakima River, Washington, July 16, Henshaw (same); Umatilla, Oregon, July 25, Henshaw (same); Ruby Valley, Elko County, Nevada, R. Ridgway; Camp Halleek, Elko County, Nevada, E. Palmer; Reno, Washoe County, Nevada (U.S.N.M.—Riley collection); Truckee Valley, Nevada, R. Ridgway; Lake Tahoe, Nevada, Packard (U.S.N.M.—Riley collection); Weeksville, Montana, August 2, Henshaw (Museum Comparative Zoology).

This is the species which has been classed, in the National Museum as belonging to Walker's *Caloptenus scriptus*, and is therefore probably the species so named by Cockerell¹ as coming from Colorado. It is, however, not that species, a female specimen of the present species having at my request been compared with the types by Mr. S. Henshaw during a recent visit in London. As compared with this, he finds the true *scriptus* to be "much larger, heavier, and with shorter, heavier, and more clumsy prosternal spine; thoracic carinae, especially the median, sharper and more prominent; cups of upper valves of ovipositor much deeper; lower valves much heavier." He also compared this with the type of Walker's *Caloptenus bilituratus* and found it the same, "agreeing as to front, eyes, thoracic carinae, prosternal spine, and mesosternites."

This species varies somewhat, and runs very close indeed to *M. atlantis*: the northern examples from British Columbia and Washington, and those from Nevada; and were it not for the considerable difference in the shape of Nevada specimens, in which the male cerci are always relatively broad, and slender, and their marked distinction from Utah specimens of *M. atlantis*, I should have hesitated to regard the species as distinct from *M. atlantis*, especially in view of the great variation in the latter species. As it is, I have been in much doubt where to place females from British Columbia and Washington, where the two species occur together.

¹Trans. Am. Ent. Soc., XX (1894), p. 337.

25. MELANOPLUS DEFECTUS, new species.

(Plate XII, fig. 6.)

Of medium or a little less than medium size, ferrugineo-flavous. Head not prominent, flavous or ferruginous or a mixture of both, marked above with a double median black line and with a piceous postocular band of varying width; vertex gently tumid, feebly elevated above the pronotum, the interspace between the eyes alike in both sexes, half as broad again as the first antennal joint; fastigium steeply declivent, deeply sulcate; frontal costa failing to reach the clypeus, subequal, as broad as or slightly broader than the interspace between the eyes, sulcate at and below the ocellus, biserially punctate throughout; eyes moderately large, not very prominent, much longer than the infraocular portion of the genae; antennae flavo-luteous, about two-thirds (male) or about three-fifths (female) as long as the hind femora. Pronotum subequal on the prozona, expanding posteriorly on the metazona, darker above than on the sides, the lateral lobes with a broad, broken, and irregular, piceous, postocular band confined to the prozona, the disk nearly plane but feebly convex, passing into the vertical lobes by a distinctly angulated but rounded shoulder nearly forming lateral carinae on the metazona; median carina distinct on the metazona, subobsolete and equal on the prozona; front margin truncate, hind margin obtusangulate, the angle well rounded; prozona feebly transverse in both sexes, scarcely or not longer than the densely punctate metazona. Prosteral spine rather short, feebly conical, very blunt, slightly appressed, suberect, shorter in the female than in the male; interspace between mesosternal lobes nearly twice as long as broad (male) or subquadrate (female). Tegmina slightly abbreviated, scarcely (female) or a little (male) surpassing the middle of the hind femora, of moderate breadth, tapering regularly but not greatly to a rather broadly rounded apex, brownish hyaline, flecked with black at base and along middle of discoidal area; wings similarly developed. Fore and middle femora of male scarcely enlarged; hind femora varying from flavous to ferruginous, the outer face and especially its upper portion more or less and rather uniformly infuscated between the incisures, the inner face trimaculate above, the lower face feebly roseate, the genicular are and a transverse bar at base of lower genicular lobe black or fuscous; hind tibiae pale red, the spines black beyond the base, ten to twelve in number in the outer series. Extremity of male abdomen clavate, a little recurved, the supraanal plate triangular with acutangulate apex and the lateral margins elevated especially on the basal half, the median sulcus tolerably deep between high and narrow but rounded walls; furcula consisting of a pair of moderately distant, scarcely diverging, tapering, slender spines, a little larger than the last dorsal segment; cerci slightly less than twice as long as median breadth, the basal half feebly tapering, the apical half narrowed by the slight oblique excision

of the inferior margin, strongly compressed or subsulcate, the apex broadly rounded; subgenital plate with its notched and doubly bossed apical margin strongly and abruptly elevated above the lateral margin.

Length of body, male, 18 mm., female, 22 mm.; antennae, male, 6 mm., female, 6.75 mm.; tegmina, male, 10.5 mm., female, 9.5 mm.; hind femora, male, 9.5 mm., female, 11.5 mm.

One male. 1 female. Grand Junction, Mesa County, Colorado. June (L. Bruner).

26. MELANOPLUS ATLANIS.

(Plate XII, fig. 7.)

- Caloptenus spretus* PACKARD, Amer. Nat., VIII (1874), p. 502; *ibid.*, IX (1875), p. 573.—RILEY, Can. Ent., VII (1875), p. 180.
- Caloptenus atlantis* RILEY?, Ann. Rep. Ins. Mo., VII (1875), p. 169; *ibid.*, VIII (1876), pp. 113-118, 153.—WHITMAN, Grasshopper (1876), p. 19.—RILEY?, Ann. Rep. Ins. Mo., IX (1877), p. 86; Loc. Plague (1877), pp. 22-24, 27, 198-199.—THOMAS, Rep. Ent. Ill., VII (1878), p. 38; Bull. U. S. Geol. Surv. Terr. IV (1878), p. 500; Ann. Rep. Chief Eng., 1878, 1845 (1878); Rep. U. S. Ent. Comm., I (1878), pp. 49-50, 52.—PACKARD, *ibid.*, I (1878), pp. 135, [140-144].—THOMAS, PACKARD, *ibid.*, I (1878), p. 140.—RILEY, *ibid.*, I (1878), pp. 229, 225, 226, 232, 237, 284, 299, 446, 458, pl. III.—THOMAS, *ibid.*, II (1881), p. 106.—LITNER, Ins. Clover (1881), p. 5.—RILEY, Bull. U. S. Ent. Comm., VI (1881), pp. 89-90; Amer. Nat., XVII (1883), p. 1073; Rep. U. S. Ent., 1883 (1883), pp. 99, 170-180, pl. II.—PACKARD, Rep. U. S. Ent. Comm., III (1883), pp. 273-277, pls. XX-XXI.—BRUNER, *ibid.*, III (1883), pp. 9, 10, 14, 54.—RILEY, Stand. Nat. Hist., II (1884), p. 194.—COOK, Beal's Grasses N. A., I (1887), p. 373.—CAULFIELD, Can. Rec. Sc., II (1887), pp. 399, 401; Can. Orth. (1887), pp. 11, 14.—WEED, Bull. Ohio Exp. St., Techn. Ser., I (1889), p. 39.—SCHWARZ, Proc. Ent. Soc. Wash., I (1890), p. 213.—HOWARD, Ins. Life, IV (1891), p. 121.—RILEY, Bull. Div. Ent. U. S. Dep. Agric., XXV (1891), pp. 26-27, figs. 4a-c.—MILLIKEN, Ins. Life, VI (1893), pp. 19, 21.
- Caloptenus atlantis* THOMAS, Bull. Ill. Mus. Nat. Hist., I (1876), p. 68.—RILEY, Amer. Nat., XI (1877), p. 665; *ibid.*, XII (1878), p. 285.—THOMAS, Rep. Ent. Ill., IX (1880), pp. 92, 96, 124.
- Caloptenus femur-rubrum* PROVANCHER!, Nat. Can., VIII (1876), pp. 109-110, fig. 12; Faune Ent. Can., II (1877), p. 36, fig. 9.
- Melanoplus devastator* SCUDDER! (pars), Proc. Bost. Soc. Nat. Hist., XIX (1878), pp. 285-286, 287-288; (pars), Ent. Notes, VI (1878), pp. 46-47, 48-49; (pars), Rep. U. S. Ent. Comm., II, app. (1880), p. 24.
- Melanoplus atlantis* SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1878), p. 286, 287; Ent. Notes, VI (1878), pp. 45, 46.—CAULFIELD, Rep. Ent. Soc. Ont., XVIII (1888), p. 71.—COMSTOCK, Intr. Ent. (1888), pp. 108, 110.
- Melanoplus atlantis* SCUDDER!, Rep. U. S. Ent. Comm., II, app. (1881), p. 24, pl. XVII, fig. 6.—BRUNER, *ibid.*, III (1883), p. 60; Can. Ent., XVII (1885), p. 17; Bull. Washb. Coll., I (1885), pp. 137-138.—RILEY, Rep. U. S. Ent., 1885 (1886), p. 233, pl. VIII, figs. 7a-c.—BRUNER, *ibid.*, 1885 (1886), pp. 303, 304, 306, 307; Bull. Div. Ent. U. S. Dep. Agric., XIII (1887), p. 11.—FERNALD, Orth. N. E. (1888), pp. 31, 33; Ann. Rep. Mass. Agric. Coll., XXV (1888), pp. 115, 117.—FLETCHER, Ann. Rep. Ent. Soc. Ont., XIX (1889), p. 10; Rep. Exp. Farms Can., 1888 (1889), p. 63.—DAVIS, Ent. Amer., V (1889), p. 81.—MARLATT, Ins. Life, II (1889), pp. 66-70.—SMITH, Cat. Ins. N. J. (1890), p. 413.—BLATCHLEY, Can. Ent., XXIII (1891), p. 98.—BRUNER, *ibid.*, XXIII (1891), p. 192; Ins. Life, III (1891), p. 229; *ibid.*, IV (1891), pp. 21, 146; Rep. Ent. Soc. Ont., XXII (1891), p. 48; Bull. Div. Ent. U. S. Dep. Agric., XXIII (1891), p. 14; Rep. St.

Bd. Agric. Nebr., 1891 (1891), pp. 243, 306.—McNEILL, *Psyche*, VI (1891), pp. 73-74.—WEED, *Can. Ent.*, XXIV (1892), p. 278.—BRUNER, *Bull. Div. Ent. U. S. Dep. Agric.*, XXVII (1892), pp. 12-29; *ibid.*, XXVIII (1893), pp. 29-30, figs. 14a-c; *ibid.*, XXX (1893), p. 35; *Publ. Nebr. Acad. Sc.*, III (1893), p. 28; *Rep. Nebr. St. Bd. Agric.*, 1893 (1893), p. 459; *Ins. Life*, VI (1893), p. 34.—SCUDDER, *Psyche*, VI (1893), p. 462.—OSBORN, *Ins. Life*, V (1893), pp. 323-325; *ibid.*, VI (1893), pp. 80-81.—MORSE, *Psyche*, VII (1894), p. 106.—BEUTENMÜLLER, *Bull. Amer. Mus. Nat. Hist.*, VI (1891), p. 306.—BRUNER, *Rep. St. Hort. Soc. Nebr.*, 1894 (1894), p. 163; *Bull. Div. Ent. U. S. Dep. Agric.*, XXXII (1894), p. 12; *Nebr. St. Hort. Rep.*, 1895 (1895), p. 69.—LITNER, *Rep. St. Mus. N. Y.*, XLVIII (1895), 410-443.

Caloptenus bilituratus BRUNER, *Rep. U. S. Ent. Comm.*, III (1883), p. 60.

Pezotettix atlantis HUNT, *Misc. Ess. Econ. Ent.*, III. (1886), pp. 120, 126.—GARMAN, *Orth. Ky.* (1894), pp. 3, 8.

Melanoplus atlantis caeruleipes COCKERELL, *Entom.*, XXII (1889), p. 127.

[Many of these references may belong to species not heretofore distinguished from *M. atlantis*.]

Varying from medium to a little above medium size, dark griseo-fuscous, often tinged more or less heavily with ferruginous. Head a little prominent, olivaceo-testaceous freckled with fuscous, above more or less infuscated, sometimes diffusing the whole, sometimes confined to two divergent longitudinal stripes, with a broad, piceous, postocular band; vertex rather tumid, somewhat elevated above the pronotum, the interspace between the eyes nearly twice as broad as the first antennal joint in both sexes; fastigium steeply declivent, shallowly sulcate, more shallowly in the female than in the male; frontal costa rather prominent, failing to reach the clypeus, feebly narrowed above especially in the male, fully as broad as the interspace between the eyes, slightly sulcate at and below the ocellus, irregularly punctate throughout, above more densely and with a tendency to a biseriate arrangement; eyes moderate, rather prominent particularly in the male, much longer than the infraocular portion of the genae; antennae rufo- or luteo-testaceous, about five-sixths (male) or three fifths (female) as long as the hind femora. Pronotum rather short, feebly and angularly constricted in the middle, the broad angulation at the principal sulcus and produced mostly by the posterior expansion of the metazona, more or less infuscated and often also ferruginous above, the lateral lobes with a generally distinct and entire but sometimes broken or maculate, broad, piceous, postocular band, confined to the prozona; disk broadly convex and passing into the vertical lateral lobes somewhat abruptly but with a well-rounded shoulder, simulating but nowhere really forming distinct lateral carinae; median carina distinct and well marked on the metazona, obscure and generally subobsolete on the prozona if not indeed obsolete, particularly between the sulci and in the female; front margin truncate but very narrowly and minutely flaring, hind margin obtusangulate, the angle very slightly rounded; prozona subquadrate—a little variable on either side (male) or distinctly transverse (female), rarely and then feebly longer than the densely punctate metazona. Prosternal spine variable, usually short, conical, a little blunt, slightly appressed, erect (male) or

short appressed subconical, very blunt, erect (female), but sometimes it is very blunt and decidedly appressed in the male, also it is occasionally distinctly transverse, but it usually shows a distinct taper, generally from base to tip; interspace between mesosternal lobes varying from quadrate to half as long again as broad (male) or from quadrate to slightly longer than broad (female). Tegmina usually surpassing considerably the hind femora, occasionally and especially in the female only a little, slender, feebly tapering, brownish fuscous, nearly always flecked lightly with fuscous throughout the discoidal area; wings rather broad, hyaline, the veins mostly testaceous, growing increasingly fuscous toward the margins, the apex sometimes most faintly, scarcely perceptibly, infumate. Thoracic episterna mostly flavo-testaceous in contrast to the fuscous surroundings. Fore and middle femora of male somewhat tumid; hind femora luteo- or flavo-testaceous, obscurely broadly and obliquely bifasciate with fuscous besides the fuscous base, the inner surface mostly flavous, more or less clouded with fuscous, the lower surface externally flushed with roseate, the geniculation mostly fuscous; hind tibiae normally rather bright red, often feebly pallescent at base, with a faint fuscous patellar spot, but not infrequently pale red or pale green or pale yellow, or even dark blue, the spines black beyond the base, nine to twelve in number in the outer series. Extremity of male abdomen a little clavate, a little recurved, the supraanal plate triangular or hastate, feebly compressed just beyond the middle, the lateral margins before that a little elevated, the tip acutangulate, the median sulcus moderately deep, evanescent apically, its bounding ridges rather high and followed apically by a pair of more distant longitudinal ridges of less importance; furcula consisting of a pair of more or less divergent, slight, slender, acuminate spines, less than a third, sometimes only a fourth, the length of the supraanal plate; cerci generally about twice as long as broad, sometimes less than that, rarely exceeding it, composed of a basal, nearly equal, feebly tumid piece, and a strongly compressed, slightly upturned and somewhat inbent apical portion, narrowed by the oblique excision of the inferior margin, the apex well rounded; subgenital plate subpyramidal, with the apical margin a little but rather abruptly elevated, thickened and mesially notched with greater or less, generally considerable, distinctness, the notch followed by a posterior sulcation to some distance.

Length of body, male, 21.5 mm., female, 24 mm.; antennae, male, 10 mm., female, 7.5 mm.; tegmina, male and female, 20 mm.; hind femora, male, 12.5 mm., female, 12.75 mm.

Three hundred and eighty-seven males, 408 females. Halifax, Nova Scotia, H. Piers; Ottawa, Canada (U.S.N.M.—Riley collection); Maine, Packard; Moosehead Lake, Maine; Bar Harbor, Mount Desert Island, Maine (S. Henshaw); White Mountains, New Hampshire, from valleys through forests to highest summits of Mount Washington, Mount Madison, Mount Lafayette—Scudder, Henshaw, Packard, Shurtleff, Morse, Mrs. Slosson (S. H. Scudder; *Museum Comparative Zoology*,

S. Henshaw; A. P. Morse); Bethlehem, Grafton County, New Hampshire (Henshaw); Shelburne, Coos County, New Hampshire; Mount Kearsarge, New Hampshire, 2,000 feet to 3251 feet (A. P. Morse); Boscawen, Merrimack County, New Hampshire (U.S.N.M.—Riley collection); Sudbury, Rutland County, Vermont; various localities in the vicinity of or belonging to Boston, Massachusetts—Hyde Park, Beverly, Clifton, Milton, Blue Hills, Brookline, Canton, Revere, Chelsea, Malden, Jamaica Plain, Cambridge (S. Henshaw; Museum Comparative Zoology; A. P. Morse; S. H. Scudder); Plum Island, Putnam, and Salem, Essex County, Massachusetts (Museum Comparative Zoology); Warwick, Franklin County, Massachusetts, Miss A. M. Edmands (same); Springfield, Hampden County, Massachusetts, Allen (same); Williamstown, Berkshire County, Massachusetts; Adams, Berkshire County, Massachusetts (A. P. Morse); Greylock, Massachusetts, 3,500 feet (same); Cape Cod, Massachusetts; Provincetown, Barnstable County, Massachusetts; Nantucket, Massachusetts (S. Henshaw; S. H. Scudder); West Chop, Marthas Vineyard, Massachusetts, Morse (Museum Comparative Zoology); Canaan and South Kent, Litchfield County, Connecticut (A. P. Morse); Sullivan County, New York, Shaler (Museum Comparative Zoology); New Jersey; Pennsylvania; Middle States, Baron Osten Sacken; Washington, D. C. (L. Bruner; U.S.N.M.—Riley collection); Danville, Pittsylvania County, Virginia, Packard (Museum Comparative Zoology); North Carolina (S. Henshaw); Beaufort, Carteret County, North Carolina, Shute (Museum Comparative Zoology); South Carolina (same); Georgia, Jones (same); Rossville, Walker County, Georgia, King (same); Vigo County, Indiana (Blatchley); Detroit, Michigan, H. Gillman; Illinois, Thomas (U.S.N.M.—Riley collection); Chicago, Illinois; Moline, Rock Island County, Illinois, McNeill; southern Illinois (Museum Comparative Zoology; S. H. Scudder); Sudbury, Ontario; Winnipeg, Manitoba, R. Kennicott; Minneapolis, Minnesota (U.S.N.M.—Riley collection); Custer, South Dakota, Bruner (same); Crawford and Greene counties Iowa, Allen; Nebraska, Dodge; Fort Robinson and Chadron, Dawes County, Nebraska, Bruner (U.S.N.M.—Riley collection); Gordon, Sheridan County, Nebraska, Bruner (same); Nebraska City, Otoe County, Nebraska, Hayden; St. Louis, Missouri (U.S.N.M.—Riley collection; S. H. Scudder); Bushberg, Jefferson County, Missouri (U.S.N.M.—Riley collection); New Madrid, Missouri, R. Kennicott; Williamsville, Wayne County, Missouri, S. W. Denton (A. P. Morse); Monticello, Lawrence County, Mississippi, Miss Helen Jennison; Canebreak, Louisiana, on cotton, Comstock (U.S.N.M.—Riley collection); Texas, Belfrage, Lincecum; Dallas, Texas, Boll; Columbus, Colorado County, Texas, on cotton (U.S.N.M.—Riley collection); Orizaba and Aguas Calientes, Mexico (L. Bruner); San Lorenzo, Chihuahua, Mexico, Palmer; Mount Alvarez, San Luis Potosi, Mexico, Palmer; Bledos, San Luis Potosi, Mexico, Palmer; Fort Grant, Graham County, Arizona (U.S.N.M.—Riley collection); 40 miles east of Tucson, Pima County,

Arizona, Palmer; Fort Whipple, Yavapai County, Arizona, Palmer; Arizona, Burrison (Museum Comparative Zoology); Flagstaff, Coconino County, Arizona, Cordley (L. Bruner); Las Cruces, Donna Ana County, New Mexico, Cockerell; Colorado (U.S.N.M.—Riley collection; C. P. Gillette; S. Henshaw); Fruita, Mesa County, Colorado (U.S.N.M.—Riley collection); Beaver Brook, Colorado, 6,000 feet; Salt Lake, Utah, Packard; Salt Lake Valley, Utah, 4,300 feet; American Fork Canyon, Utah, 9,500 feet; Provo, Utah County, Utah; Spring Lake Villa, Utah County, Utah, Palmer; Douglas, Converse County, Wyoming (U.S.N.M.—Riley collection); Evanston, Uinta County, Wyoming, 6,800 feet; Fort McKinney, Johnson County, Wyoming (U.S.N.M.—Riley collection); Yellowstone National Park; Beaver Canyon Road, Idaho; Yellowstone, Montana (U.S.N.M.—Riley collection); Putnam, Custer County, Montana, A. Sloggy (same); Eldorado County, California, 4,000 feet, Gissler; Umatilla, Oregon, Henshaw (Museum Comparative Zoology); The Dalles, Wasco County, Oregon, Henshaw (same); Washington, Morrison (S. Henshaw); Camp Umatilla, Washington, Henshaw (Museum Comparative Zoology); Preston's, Klikitat—Lone Tree, Yakima River—opposite Ellensburg, Yakima River—Olmstead's, near Ellensburg—Nelson's, Yakima River—Yakima City—and Brown's, Colville Valley, Washington, Henshaw (same); British Columbia, Crotch (Museum Comparative Zoology); explorations in Arctic America and Yukon River, Alaska, R. Kennicott; Laggan, Alberta, Bean (S. Henshaw; S. H. Scudder); Banff and Calgary, Alberta, Bean (S. Henshaw); Fort McLeod, Alberta (U.S.N.M.—Riley collection; L. Bruner).

The published accounts add very little to the above range of distribution, except that it is reported from Quebec (Provancher), northern California (Packard), Nevada (Scudder), and south as far as middle Florida—probably by error (Packard).

It is probable, therefore, that it is found in every part of the continuous district of the United States, excepting in the southernmost Atlantic States and most of California, being thus limited very much as *M. femur-rubrum*; it extends also into central Mexico, and north of our boundary is found from Atlantic to Pacific as far at least as latitude 50° (excepting Newfoundland), and on the Pacific side reaches north to the Yukon River and probably the Lower McKenzie.

Next to *M. spretus* this is our most destructive locust, and east of the Mississippi probably the only one ever doing much damage. Its injuries, however, are not for a moment to be compared with those inflicted by *M. spretus*, for, though possessing good powers of flight and on rare occasions known to migrate in swarms, its injuries can only be classed as local, and they are never so serious as those inflicted by *M. spretus*; nevertheless they are by no means slight, and immense destruction of grain is to be laid at its door. Bruner, who has studied this insect over a wide extent of country, says that "while it occurs over . . . an extended territory, it appears to be . . . partial to hilly

or mountainous regions . . . ; it seems also to prefer a wooded or mixed country to the open prairies or plains.”

This is one of the most variable of the Melanopli, and it is sometimes difficult to distinguish from its immediate allies. The above description is drawn up primarily from Eastern examples which came from the region from which the species was originally described. Specimens from the dry plains of the West (especially noted in those from Utah) are decidedly paler and more cinereous in aspect than those from relatively fertile country, and they have often a flavous stripe bordering the eye and continued along the position of the lateral carinae: a similar but not so striking a cinereous hue attaches to those that occur in sandy localities in the Eastern States, as along the sea margin. The exact contrary is shown in Canada just east of the Rocky Mountains, where the specimens are exceedingly dark in color, almost blackish fuscous, with heavy fasciation of the hind femora;¹ but here again a difference of another sort occurs as one passes eastward, specimens from Laggan and Banff almost invariably having relatively long and slender male cerci, while at Calgary all that have been seen (with a very few from the former localities) have male cerci hardly more than half as long again as broad. Specimens from Mexico, however, agree very closely with those from New England.

Specimens with green hind tibiae have been seen by me from the White Mountains, New Hampshire, but not from the summits (except Kearsarge 3,251 feet), from the vicinity of Boston, at Provincetown, and on the island of Nantucket, Massachusetts, from Laggan, Alberta, the Yellowstone region, Montana, Wyoming, Nebraska, Missouri, Colorado, from the Salt Lake valley and American Fork Canyon (9,500 feet), Utah, Texas, and Chihuahua, Mexico. Specimens with dark blue hind tibiae have been seen from Iowa, Colorado, American Fork Canyon, Utah, and Texas. In nearly or quite all these cases specimens with red hind tibiae predominated in the same district.

According to Riley the first mature insects observed one year about St. Louis, Missouri, appeared July 12, and deposited eggs by July 20. The eggs had a quadrilinear arrangement in the pod, hatched in from three to four weeks, and the young took eighty days to reach maturity. He says he has proved that the insect is there double-brooded, though I find no data published by him in support of the statement, and the above facts drawn from his writings militate against it. Bruner, however, agrees with it, saying that in the District of Columbia a second brood appears in the late autumn, composed of smaller and darker individuals. I have seen nothing of the kind in New England.

The points in which the unfledged locusts differ from the same stages in *M. spretus* and *M. femur-rubrum* are explained and figured in the first report of the United States Entomological Commission, in which many other interesting points regarding this species will be found.

¹ Specimens from Sudbury, Ontario, are similarly dark.

27. MELANOPLUS SPRETUS.

(Plate XII, fig. 8.)

- Caloptenus spretus* UHLER¹, MS. (1863).—[WALSH], Pract. Ent., II (1866), p. 1.—GLOVER, Rep. U. S. Dep. Agric., 1867 (1867), p. 65, fig.—SCUDDER, Proc. Bost. Soc. Nat. Hist., XI (1868), p. 436; *ibid.*, XII (1868), p. 88.—[WALSH, RILEY], Amer. Ent., I (1868), pp. 16, 73, fig. 65; *ibid.*, I (1869), p. 249.—WALSH, Rep. Ins. Ill., I (1868), p. 82.—PACKARD, Guide Ins. (1869), p. 570, fig. 564a.—THOMAS, Amer. Ent., II (1870), p. 81; Proc. Acad. Nat. Sc. Phila., 1870 (1870), p. 78.—WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 678.—GLOVER, Rep. U. S. Dep. Agric., 1870 (1870), p. 76, fig. 31; *ibid.*, 1871 (1871), p. 78, fig. 11.—SCUDDER, Fin. Rep. U. S. Geol. Surv. Nebr. (1871), pp. 250, 252.—THOMAS, Ann. Rep. U. S. Geol. Surv. Terr., II (1871), pp. 265, 281; *ibid.*, V (1872), p. 451.—DODGE, Can. Ent., IV (1872), p. 15.—SMITH, Rep. Comm. Bd. Agric., 1872 (1872), p. 366, fig. 9.—LEBARON, Ann. Rep. Nox. Ins. Ill., II (1872), p. 158.—GLOVER, Ill. N. A. Ins., Orth. (1872), pl. VIII, fig. 1, pl. XIII, fig. 15; Rep. U. S. Dep. Agric., 1872 (1872), p. 121; *ibid.*, 1873 (1873), pp. 125, 136, fig. 8.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 164.—GLOVER, Rep. U. S. Dep. Agric., 1874 (1874), p. 28.—THOMAS, Key Ill. Orth. (1874?), p. 3.—BETHUNE, Can. Ent., VI (1874), p. 185.—SCUDDER, Daws. Rep. Geol. Rec. 49th par. (1875), p. 343.—RILEY, Ann. Rep. Ins. Mo., VII (1875), p. 121, figs. 23-25, 27, 28, 31, 32, maps.—DODGE, Can. Ent., VII (1875), p. 133.—BETHUNE, Ann. Rep. Ent. Soc. Ont., 1874 (1875), pp. 8, 30, figs. 31, 34; *ibid.*, 1875 (1876), p. 45, fig.; Can. Ent., VIII (1876), p. 4.—PUTNAM, Proc. Dav. Acad. Nat. Sc., I (1876), pp. 187, 265.—THOMAS, *ibid.*, I (1876), pp. 260, 265.—CARPENTER, Field and For., I (1876), p. 81.—MERRICK, *ibid.*, II (1876), p. 64.—RILEY et al., Rocky Mt. Loc. (1876), pp. 37-58, figs. 1-4.—WHITMAN, Grasshopper (1876), pp. 1-17, 4 figs.—DAWSON, Can. Nat., n. s., VIII (1876), pp. 119-134.—BROADHEAD, Trans. St. Louis Acad. Sc., III (1876), pp. 345-349.—SCUDDER, Bull. U. S. Geol. Surv. Terr., II (1876), p. 261; Psyche, I (1876), p. 144.—THOMAS, Bull. Ill. Mus. Nat. Hist., I (1876), p. 68.—RILEY, Rep. Ins. Mo., VIII (1876), pp. 57-156, figs. 39a-e; *ibid.*, IX (1877), pp. 57-124, figs. 18-22, map; Amer. Nat., XI (1877), p. 664.—SCUDDER, Ann. Rep. Geogr. Surv. W. 100th mer., 1876 (1877), p. 281 [Ann. Rep. Chief Eng., 1876, p. 501].—BRUNER, Can. Ent., IX (1877), p. 144.—DODGE, Field and For., II (1877), p. 206.—UHLER, Bull. U. S. Geol. Surv. Terr., III (1877), pp. 359, 798.—BESSEY, Bienn. Rep. Iowa Agric. Coll., VII (1877), p. 209.—THOMAS, Rep. Geogr. Surv. W. 100th mer., V (1877), p. 892.—PHILLIPS, Statist. Minn., 1876 (1877), p. 88-112.—WHITMAN, Rep. Rocky Mt. Loc., 1876 (1877), pp. 1-43, map.—THOMAS, Rep. Ent. Ill., VI (1877), pp. 44-56.—RILEY, THOMAS, PACKARD, Bull. U. S. Ent. Comm., II (1877), pp. 1-15, 11 figs., map; *ibid.*, 2d ed. (1877), pp. 1-14, 11 figs., map.—RILEY, Loc. Plague (1877), pp. 1-231, maps 1-3, figs. 2, 3, 6-14.—DAWSON, Can. Nat., n. s., VIII (1877), pp. 207-226; *ibid.*, VIII (1878), pp. 411-417.—THOMAS, Rep. U. S. Ent. Comm., I (1878), pp. 31-52, 114-130, 334-350.—PACKARD, *ibid.*, I (1878), pp. 136-211.—RILEY, *ibid.*, I (1878), pp. 212-257, 279-334, 350-437, 443-459.—RILEY, THOMAS, PACKARD, *ibid.*, I (1878), pp. 10-16, 1-29, 1-294, pl. I, maps 1-3.—THOMAS, Rep. Ent. Ill., VII (1878), pp. 35, 36-38, figs. 4, 6, 8; Bull. U. S. Geol. Surv. Terr., IV (1878), pp. 483, 485.—RILEY, Amer. Nat., XII (1878), p. 283.—PACKARD, *ibid.*, XII (1878), p. 516; *ibid.*, XIII (1879), p. 586.—GIRARD, Traité élém. d'ent., II (1879), p. 248.—THOMAS, Amer. Ent., III (1880), p. 225.—CARPENTER, *ibid.*, III (1880), p. 296.—BOWLES, Can. Ent., XII (1880), pp. 131-133, fig. 19.—ABBÉ, Amer. Nat., XIV (1880), pp. 735-738.—THOMAS, Psyche, III (1880), p. 114; Rep. Ent. Ill., IX (1880), pp. 92, 96, 121-123, figs. 19-21.—PACKARD, RILEY, Rep. U. S. Ent. Comm., II (1881), pp. 1-14.—THOMAS, *ibid.*, II (1881), pp. 14-155.—PACKARD, *ibid.*, II (1881), pp. 156-163, 178-183.

223-242, fig. 9, pl. i. figs. 9-15.—MINOT, *ibid.*, II (1881), pp. 183-222, pls. II-VII.—RILEY, *ibid.*, II (1881), pp. 259-322, pl. XVI; *Can. Ent.*, XIII (1881), p. 180.—PACKARD, *Amer. Nat.*, XV (1881), pp. 285-302, 372-379, pls. II-IV, v. figs. 1-3.—HART, *ibid.*, XV (1881), p. 749.—RILEY, *ibid.*, XV (1881), pp. 1007, 1013.—BOWLES, *Ann. Rep. Ent. Soc. Ont.*, 1880 (1881), pp. 28-29.—PACKARD, *Nat. Leis. Hour.* V (1881), No. 4, pp. 4-10, figs.—LINTNER, *Ins. Clover* (1881), p. 5; *Ann. Rep. Ins. N. Y.*, I (1882), p. 7, fig. 3a.—MANN, *Psyche*, III (1883), pp. 379-380.—RILEY, *Bull. Div. Ent. U. S. Dep. Agric.*, II (1883), p. 5.—BRUNER, *ibid.*, II (1883), pp. 7-22, 29.—PACKARD, *Rep. U. S. Ent. Comm.*, III (1883), pp. 3-7, 263-273, 277-279, 346-347, pls. XVI-XIX, maps 1-2.—BRUNER, *ibid.*, III (1883), pp. 8-54.—MARTEN, *ibid.*, III, App. (1883), pp. 50-54.—SAUNDERS, *Ins. Inj. Fruits* (1883), p. 157, figs. 165, 166.—BRUNER, *Bull. Div. Ent. U. S. Dep. Agric.*, IV (1884), pp. 51-62.—RILEY, *Stand. Nat. Hist.*, II (1884), pp. 195-201 figs. 274-281; *Rep. U. S. Ent.*, 1884 (1885), p. 323.—BRUNER, *ibid.*, 1884 (1885), pp. 398-399.—CAULFIELD, *Rep. Ent. Soc. Ont.*, XVIII (1886), pp. 65, 67, figs. 19, 21.—RILEY, *Rep. U. S. Ent.*, 1885 (1886), pp. 228-229, pl. VIII, figs. 6a-c.—HANSEN, *Nordam. Vandregr.* [Tidskr. pop. fremst. naturw.], (1886), pp. 1-32.—COOK, *Beal's Grasses N. A.*, I (1887), pp. 373, 396, 409, fig. 156.—CAULFIELD, *Can. Rec. Sc.*, II (1887), pp. 399, 401; *Can. Orth.* (1887), pp. 11, 14.—RILEY, *Ins. Life*, I (1888), pp. 30-31.—PARSONS, *ibid.*, I (1889), p. 380.—WEED, *Bull. Ohio Exp. St., Techn. Ser.*, I (1889), p. 40.—LUGGER, *Rep. Agric. Exp. St. Minn.* (1889), pp. 339-343, figs. 5, 13, 15, 19-22; *Bull. Agric. Exp. St. Minn.*, VIII (1889), pp. 305-349, figs. 1-4, pl. I, map.—LINTNER, *Rep. Ins. N. Y.*, VII (1891), p. 338.—RILEY, *Ins. Life*, III (1891), pp. 183, 438; *Bull. Div. Ent. U. S. Dep. Agric.*, XXV (1891), pp. 9-26, figs. 1-3, map, pl. I, figs. 1-5.—OSBORN, *Goss. Bull. Iowa Exp. St.*, XIV (1891), pp. 174-175.—PIERCE, *Ins. Life*, IV (1891), p. 80.—RILEY, *ibid.*, IV (1892), p. 323.

Acridium spretis THOMAS, *Trans. Ill. St. Agric. Soc.*, V (1865), p. 450.

Pezotettix spretus STÅL, *Bih. k. Sv. Vet.-Akad. Handl.*, V (1878), No. 9, p. 14.—HUNT, *Misc. Ess. Econ. Ent.*, III. (1886), pp. 120-122, 126.

Melanoplus spretus SCUDDER, *Proc. Bost. Soc. Nat. Hist.*, XIX (1878), p. 287; *Ent. Notes*, VI (1878), p. 46; *Rep. U. S. Ent. Comm.*, II, App. (1881), p. 24.—BRUNER, *ibid.*, III (1883), p. 60.—RILEY, *Ent. Amer.*, I (1885), p. 177.—FLETCHER, *Rep. Ent. Can.*, 1885 (1885), pp. 9-10, fig. 1.—BRUNER, *Bull. Washb. Coll.*, I (1885), p. 138; *ibid.*, I (1886), p. 200; *Rep. U. S. Ent.*, 1885 (1886), pp. 303-307.—CAULFIELD, *Rep. Ent. Soc. Ont.*, XVIII (1886), p. 71.—BRUNER, *Bull. Div. Ent. U. S. Dep. Agric.*, XIII (1887), pp. 9-17, 33.—COMSTOCK, *Intr. Ent.* (1888), pp. 108-110, figs. 97a-f.—BRUNER, *Rep. St. Bd. Agric. Nebr.*, 1888 (1888), p. 88, figs. 1-3.—RILEY, *Ins. Life*, II (1889), p. 87.—BRUNER, *Bull. Div. Ent. U. S. Dep. Agric.*, XXII (1890), p. 104; *ibid.*, XXIII (1891), p. 14; *Can. Ent.*, XXIII (1891), p. 192; *Ins. Life*, III (1891), p. 229; *ibid.*, IV (1891), pp. 20-21; *Rep. Ent. Soc. Ont.*, XXII (1891), pp. 47-48; *Rep. St. Bd. Agric. Nebr.*, 1891 (1891), pp. 243, 306-307, figs. 81-83.—MCNEILL, *Psyche*, VI (1891), p. 73.—BRUNER, *Bull. Div. Ent. U. S. Dep. Agric.*, XXVII (1892), pp. 11-24.—OSBORN, *Proc. Iowa Acad. Sc.*, I, Pt. II (1892), p. 118.—KELLOGG, *Inj. Ins. Kans.* (1892), pp. 22-25, figs. 6a-d, 12a-f, 13a-f.—WEBSTER, *Bull. Ohio Agric. St.* (2), XLV (1892), p. 205, fig. 29.—BRUNER, *Bull. Div. Ent. U. S. Dep. Agric.*, XXVIII (1893), pp. 27-29; *ibid.*, XXX (1893), p. 35; *Publ. Nebr. Acad. Sc.*, III (1893), p. 28; *Rep. St. Bd. Agric. Nebr.*, 1893 (1893), pp. 459-460, figs. 99-101.—OSBORN, *Ins. Life*, VI (1893), pp. 80-81.—BRUNER, *Rep. St. Hort. Soc. Nebr.*, 1894 (1894), pp. 163, 205, fig. 69; *ibid.*, 1895 (1895), p. 69.—LINTNER, *Rep. St. Mus. N. Y.*, XLVIII (1895), p. 441, fig. 18.

Melanoplus spretus caeruleipes COCKERELL, *Entom.*, XXII (1889), p. 127.

Of large size, but of slender form, light griseo-fuscous, more or less cinereous, and often tinged to a greater or less degree with ferruginous.

Head somewhat prominent, light fusco-olivaceous, with a broad, piceous, postocular band, and above more or less infuscated or dulled in color, often with a pair of longitudinal fuscous stripes; vertex rather tumid, raised considerably above the level of the pronotum, the interspace between the eyes half as broad again (male) or fully twice as broad (female) as the first antennal joint; fastigium steeply declivent, rather deeply (male) or shallowly (female) sulcate throughout; frontal costa moderately prominent, distinctly failing to reach the clypeus, slightly narrowed above, especially in the male, about as broad as the interspace between the eyes, feebly and broadly sulcate at and below the ocellus, feebly punctate, above biserially; eyes not very large nor very prominent, not more so in the male than in the female (unusual in *Melanoplus*), slightly shorter than the infraocular portion of the genae; antennae testaceous, nearly two-thirds as long as the hind femora in both sexes, scarcely relatively shorter in the female than in the male. Pronotum very short, equal on the prozona, expanding somewhat on the metazona, light brownish fuscous, often ferruginous, the lateral lobes with a much broken and maculate postocular piceous or dark fuscous band confined to the prozona, the disk broadly convex, passing into the vertical lateral lobes by a rounded angle forming a blunt shoulder on the metazona and posterior section of the prozona only; median carina distinct and antero-posteriorly convex on the metazona, feeble and often subobsolete on the prozona; front margin truncate, hind margin feebly obtusangulate, the angle sometimes rounded; prozona distinctly transverse, more so in the female than in the male, shorter (particularly in the female) than the finely and very feebly punctate metazona. Prosternal spine rather long, appressed, feebly conical, very blunt, erect, shorter in the female than in the male; interspace between mesosternal lobes from half as long again to twice as long as broad (male) or quadrate (female). Tegmina exceptionally long, far surpassing the hind femora, not very narrow, subequal, brownish testaceous, heavily flecked with blackish fuscous, usually through the discoidal area but sometimes confined to the middle line; wings ample, hyaline, the veins mostly fuscous, but testaceous next the costal margin. Fore and middle femora only a little tumid in the male; hind femora testaceo-ferruginous clouded with fuscous above, particularly in broad basal, premedian and postmedian patches, the geniculation mostly blackish fuscous, the lower genicular lobe pallid testaceous with a basal blackish bar, the inferior surface, especially externally, flushed with roseate; hind tibiae bright red throughout, the spines black almost to the very base, ten to eleven, rarely twelve, in number in the outer series. Extremity of male abdomen a little clavate, somewhat recurved, the supraanal plate triangular or subhastate, faintly compressed just beyond the middle, the margins feebly elevated on basal half, the apex subacutangulate, the median carina percurrent and rather deep, between rather high and sharp ridges; furcula consisting of a pair of slight, tapering and acuminate, flattened, more or less divergent spines, about

a fourth as long as the supraanal plate; cerci forming nearly flat plates, about half as long again as broad, lying in a nearly uniform subvertical plane, generally slightly curved or bent upward, the apical half slightly more compressed than the basal and narrowed by a considerable oblique excision of the inferior margin, the tip broadly rounded or subtruncate; subgenital plate roundly subpyramidal, the apical margin with moderate abruptness, somewhat elevated, thickened, and mesially notched distinctly.

Length of body, male, 25 mm., female, 28 mm.; antennae, male, 9 mm., female, 8.75 mm.; tegmina, male, 26.5 mm., female, 27.5 mm.; hind femora, male and female, 14 mm.

Two hundred and seventy-six males, 439 females. I refrain from giving in detail the localities from which I have seen specimens, both on account of their number and because, from the irregular distribution of the insect in different years, such details would have little value without dates, which are not always accessible; farther on, however, I give all that are of special interest.

The name of this species is to be credited to Mr. P. R. Uhler, who placed it in his collection thirty or more years ago and communicated it to various persons, who used it, sometimes in an incorrect form. The original specimens were received from Mr. Robert Kennicott, and were obtained by him from a migratory horde which settled in the then Red River settlements, now Winnipeg and vicinity, Manitoba. On Mr. Uhler's generous transfer of his collection to me, these specimens, with their history, came into my possession, and I now have them with his original labels. One has been placed in the National Museum.

It was thus known from the start as a migratory insect, and comparing it with any species of the genus one would at once be struck with the greater length of the tegmina and wings. These were measured by Riley; in forty-eight males the tegmina extended beyond the abdomen 5 to 10 mm., with an average of 7.6 mm.; in ninety-nine females they ranged from 3 to 10 mm. beyond the abdomen, the average 6.7 mm.

It is now well known as the "Rocky Mountain Locust" or destructive locust of the States in the western half of the Mississippi Valley. It has been more written about than any other American Orthopteron, and was specially discussed by the United States Entomological Commission, organized to devise methods of checking its ravages after a study of its natural history. It forms the almost exclusive subject of their first report, and occupies a considerable space in their second. Although a considerable body of the evidence adduced by them is contradictory and in part of doubtful application to this particular species, their conclusions are in very large measure well founded. As appears from a study of their work and other available material, the following conclusions may be fairly drawn:

(1) The home of the species is in favorable localities in the elevated region of the Rocky Mountains or immediately bordering it from the

South Saskatchewan to Wyoming, inclusive, and in the Rocky Mountain region proper in Colorado and Utah.

(2) In certain years, especially in dry seasons, between mid-July and mid-September, migratory hordes of incredible numbers and of both sexes pass from their natural breeding grounds to the east, southeast, and south, conveyed by the winds (toward which they head) over a greater or less and sometimes a vast extent of country from Lake Winnipeg to or almost to the Gulf of Mexico, rarely passing farther east than longitude 93°, and devastating the countries they reach to an alarming extent, sometimes in places absolutely destroying all standing crops and defoliating fruit trees.

(3) As they rise for flight from home only in dry clear weather (when the prevailing winds are from the north or northwest), they do not seriously invade the regions (mostly infertile) to the west of their home.

(4) The invaders extend or may extend their flights to a distance of at least 500 miles from their point of origin, but there is no clear evidence to show that (as claimed by the Commission) they extend it to double that distance.

(5) They deposit their eggs throughout the invaded territory, but their descendants therein of the succeeding year not only do not effect a tithe of the damage of the preceding year (although on the ground earlier), but when winged move about in swarms from place to place, their prevailing direction—at least during the earlier part of the season—being the reverse of that of their parents; but even when they alight and cover the ground they are far less harmful than were their invading parents.

(6) With few exceptions, movements on the wing are with or nearly with the wind, and are usually made in clear weather between 9 a. m. and 4 p. m., but they are sometimes certainly made at night.

(7) Relatively speaking, exceedingly few of the returning swarms ever reach the true home of the species. As a rule, they show signs of enfeeblement and deposit few eggs in the invaded region, so that their descendants on the invaded soil grow less and less numerous, and, in effect if not in fact, die out in the course of a very few, probably at most two or three, years.

I can add almost nothing to the facts given by the Entomological Commission. It may be worth while to state that in 1877 I took or noted this insect at the following points: July 11, between Idaho and Georgetown, Colorado, common, both mature and immature; July 12–13, Georgetown, Colorado, from 8,500 feet to above timber, mature and immature; July 16, Argentine Pass, Colorado, 13,000 feet, in abundance, from young just hatched to imago, and masses of dead imago under stones on the mountain crests; July 20, Laramie, Wyoming; July 21–31, Green River, Wyoming, plenty but not abundant and mostly mature; Alkali Station, north of Green River, Wyoming, 6,000 feet; August 1–4, Salt Lake Valley, mostly mature, very plenty everywhere

but particularly in the southern end of the valley; August 2-3, American Fork Canyon, Utah, 9,500 feet; August 6, Evanston, Wyoming, 6,800 feet, plenty; August 11-16, South Park, Colorado, 8,000 to 10,000 feet, everywhere, mature; August 13, Mount Lincoln, Colorado, 11,000 to 13,000 feet, crowds of nymphs and imagos, as well as masses of dead imagos under stones at summit; August 17-22, Florissant, Colorado, 8,000 feet; August 24, Pikes Peak, Colorado, 12,000 to 13,000 feet; August 24-25, Manitou, Colorado, 6,300 feet; August 26, Colorado Springs, Colorado, plenty; August 28-29, Garland, Colorado, 8,000 feet, plenty; August 29, Sierra Blanca, Colorado, below 10,000 feet, none seen above timber; August 30-31, Pueblo, Colorado, 4,700 feet, plenty; August 31, Animas, Colorado; September 1, Lakin, Kansas, plenty.

I have also seen specimens from the following localities, which have some special interest: Fort Hayes, Kansas, collected by J. A. Allen in June, 1871 (not heretofore reported in Kansas in this year); Preston, Texas, Captain Pope, May 15, 1854 (necessarily the progeny of an invading flight in a previous year, and none are recorded either in Texas or Arkansas between 1850 and 1853, inclusive); Ringgold Barracks, on the Lower Rio Grande, A. Schott, presumably also in the spring of 1854, when the Mexican Boundary Commission was at work there; Sonora, Mexico, A. Schott, and San Lorenzo, Chihuahua, Mexico, E. Palmer, showing that it reaches Mexico, and that too even as far west as Sonora. I have also a single specimen from California from Mr. H. Edwards, but it may have been taken in that part of the State east of the Sierra Nevada.

A tabular view of "locust years" for the different States will be found in the first report of the Commission, page 113.

This insect is normally single brooded; the eggs winter and the earliest (those in warm exposures) hatch in Texas from the middle to the last of March, and "continue to hatch most numerous about four days later with each degree of latitude north," so that in Montana and Manitoba it is from the middle of May to the first of June. This is in the temporary region; probably it is correspondingly later on the higher levels of the permanent breeding grounds. The young reach maturity in sixty to seventy-two days, to judge from those reared in confinement, and after a few days couple, the female beginning to lay eggs in about a fortnight thereafter. The eggs are laid in almost any kind of soil, but by preference in bare, sandy places, and in their permanent home they show a preference for the shaded base of shrubby plants; they are laid in a sort of pod, with a quadrilinear arrangement therein. Several pods may be laid by a single female, Mr. Riley having on three different occasions obtained two pods from single females in confinement, laid at intervals of eighteen, twenty-one, and twenty-six days, respectively.

The migratory instinct appears to be strongest within about three weeks from the time of attaining maturity, or shortly before and during

the season of oviposition. The return flights in the "temporary region" begin from the 5th to the 10th of May in latitude 35°, and about four days later with each degree farther north. Mr. Riley, from whose accounts these statements are drawn, gives a long list of plants and trees attacked by this locust and its preferences among them.¹

7. DEVASTATOR SERIES.

This group is composed of very closely related species, often difficult to distinguish, in which the male prozona is quadrate or subquadrate, and the immature markings on the lateral lobes of the pronotum, characteristic of the young of *Melanoplus*, occasionally persist in the adult and especially in the female; the interspace between the mesosternal lobes of the male is always longer than broad, varying from a little more than half as long again to a little more than twice as long as broad. The tegmina are always fully developed and generally maculate; the hind tibiae are variable in color, often within the species, and have from nine to thirteen spines in the outer series.

The supraanal plate is similar to that of the femur-rubrum series, but less constricted in the middle and shorter; the furcula consists of a pair of parallel or subparallel, tapering, tolerably long, generally flattened, acuminate fingers; the cerci are very simple, rather small, not reaching the tip of the supraanal plate, slender and subequal, tapering feebly in the basal half, equal beyond, bluntly rounded at tip, and a little incurved, generally slightly sulcate or dimpled apically on the outer side; the subgenital plate is broad, of subequal breadth, but slightly broader at base than at tip, apically elevated and the apical margin well rounded, thickened, and weakly notched.

The insects are of small or medium size, and the species, eight in number, are separable with difficulty. They are confined almost exclusively to California, a single one of them only occurring also a little beyond its boundaries in the neighboring regions. It is the characteristic group of the Pacific coast.

28. MELANOPLUS DIMINUTUS, new species.

(Plate XII, fig. 9.)

Dark brownish fuscous with a ferruginous tinge. Head somewhat prominent, brownish testaceous, more or less, generally profusely, dotted with fuscous, and a fuscous band behind the eyes; vertex rather tumid, somewhat elevated above the pronotum; interspace between the eyes not very broad, equal to (male) or slightly broader than (female) the first antennal joint; fastigium steeply declivent, deeply sulcate throughout; frontal costa fading out halfway between the ocellus and clypeus, distinctly contracted above, equal elsewhere and broader than (male) or as broad as (female) the interspace between the eyes, scarcely sulcate but with prominent margins, seriatly punctate at the side;

¹ First report of the Entomological Commission, pages 251-252.

eyes large, prominent, especially in the male, much longer than the infraocular portion of the genae, broadly convex anteriorly; antennae about a half (male) or two-thirds (female) as long as the hind femora, dull castaneous. Pronotum feebly constricted in the middle, enlarging almost as much in front as behind, the front border truncate, the hind border somewhat obtusangulate, fusco-castaneous, profusely and rather coarsely punctate with fuscous above, the lateral lobes with a maculate piceous band on the upper part of the prozona, often divided obliquely, especially in the female, by a dull luteous stripe; median carina percurrent, sometimes feebler on the prozona and often subobsolete between the sulci, the disk passing by a rounded shoulder, more distinct on the metazona than on the prozona, into the slightly tumid lateral lobes; prozona quadrate (male) or feebly transverse (female), scarcely longer than the feebly punctate metazona. Prosternal spine not very long and moderately slender (male) or short and stout (female), appressed conical, blunt, erect; interspace between mesosternal lobes about half as long again as broad (male) or slightly longer than broad (female). Tegmina reaching the tips of the hind femora (male) or a little shorter than that, shorter than the abdomen (female), not very slender, tapering and narrowly rounded at tip, distinctly maculate in the discoidal area, especially in the female, brownish fuscous; wings moderately broad, pellucid, with glauco-fuscous veins. Hind femora dark testaceous with basal patch and oblique premedian and postmedian bars of blackish fuscous, dull red beneath, the genicular arc black, the lower genicular lobe pallid marked with fuscous; hind tibiae sordid glaucous, dull lutescent apically and basally, occasionally pale red, the spines black except at base, ten to eleven, usually eleven, in number in the outer series. Extremity of male abdomen clavate, a little elongate, well rounded, considerably upturned, the supraanal plate triangular with subrectangulate apex, the lateral margins basally rounded, broadly upturned, the percurrent median sulcus a mere slit between rather high compressed walls, with a pair of pronounced terminal ridges; furcula consisting of a pair of rather slender, depressed, tapering, acuminate, parallel fingers, reaching nearly to the middle of the supraanal plate; cerci small, slender, nearly straight and nearly equal, but basally tapering and apically a little inbent, rather stout, well rounded at apex, and with the inbent portion deeply dimpled exteriorly; subgenital plate rather broad, rather short, considerably and abruptly elevated apically, but not prolonged posteriorly, the apical margin subtruncate, distinctly notched.

Length of body, male 16 mm., female 17 mm.; antennae, male 6.25 mm., female 5 mm.; tegmina, male 12.5 mm., female 11 mm.; hind femora, male 9.5 mm., female 10 mm.

Five males, 9 females. San Francisco, California, November (U.S. N.M.—Riley collection); Marin County, California, August 8 (same); Monterey, California, October 19, next the seashore.

This is one of the smallest species of *Melanoplus*.

29. MELANOPLUS CONSANGUINEUS, new species.

(Plate XII, fig. 10.)

Dark ferrugineo-fuscous. Head slightly prominent, very dark testaceous, heavily infuscated above and sometimes flecked with fuscous on face and genae, a piceous band behind the eyes; vertex rather tumid, well raised above the pronotum, the interspace between the eyes rather narrow, about as wide as (male) or a little wider than (female) the first antennal joint; fastigium steeply declivent, broadly and rather deeply sulcate; frontal costa equal (female) or narrowed above (male), at its broadest considerably (male) or somewhat (female) broader than the interspace between the eyes, fading below, slightly sulcate at and below the ocellus, seriatly punctate on the sides: eyes as in *M. diminutus*; antennae dark castaneous, less than two-thirds as long as the hind femora, of about equal relative length in the two sexes. Pronotum subequal, enlarging a little on the metazona and feebly in front; front margin truncate, hind margin obtusangulate, the lateral lobes with a broad piceous belt across the prozona above, below which they are lighter than the disk; median carina distinct on the metazona, feeble on the prozona, and nearly obsolete between the sulci; lateral carinae marked only by a rounded shoulder more distinct on the metazona than on the prozona; prozona subquadrate, scarcely longer than the finely and not sharply punctate metazona. Prosternal spine erect and rather long, conico-cylindrical (male) or rather short, appressed conical (female); interspace between mesosternal lobes about half as long again as broad (male), or only a little longer than broad (female). Tegmina nearly reaching (male) or slightly surpassing (female) the tip of the hind femora, rather slender, tapering, strongly rounded apically, dark fuscous with tolerably distinct maculation in the discoidal area; wings not very broad, hyaline, with glauco-fuscous veins. Hind femora dull testaceous, marked as in *M. diminutus*, the hind tibiae glaucous, the spines pallid at base, black at tip, ten to eleven in number in the outer series. Extremity of male abdomen clavate, well upturned, the supraanal plate triangular, the lateral margins broadly elevated and at base well rounded, the median sulcus narrow and, except apically, deep, its bounding walls rather high and abrupt; furcula consisting of a pair of depressed, rather slender, tapering, acuminate, slightly divergent fingers, falling somewhat short of the middle of the supraanal plate; cerci small and slender, about four times as long as broad, nearly straight but gently incurved throughout, broadly rounded apically, subequal but tapering slightly on basal half, the apical third deeply sulcate exteriorly, the whole considerably shorter than the supraanal plate; subgenital plate moderately broad and short, the lateral margins somewhat abruptly and moderately elevated apically, but not prolonged posteriorly, the apical margin narrowly subtruncate and feebly emarginate.

Length of body, male, 16.5 mm., female, 22 mm.; antennae, male 6.25 mm., female, 7 mm.; tegmina, male, 11.5 mm., female, 16 mm.; hind femora, male, 10.5 mm., female, 11.5 mm.

One male, 1 female. Sacramento County, California (U.S.N.M.—Riley collection).

This species is closely related to the last, and with larger material may possibly prove the same.

30. MELANOPLUS SIERRANUS, new species.

(Plate XIII, fig. 1.)

Dark brownish fuscous, lighter beneath. Head fusco-olivaceous, punctate with fuscous, ferrugineo-testaceous above, with a postocular black stripe and the margins of the fastigium more or less marked with black; vertex very gently tumid, hardly elevated above the pronotum, the interspace between the eyes slightly wider than (male) or nearly twice as wide as (female) the first antennal joint; fastigium strongly declivent, heavily (male) or broadly and rather shallowly (female) sulcate; frontal costa subequal, feebly broader than the interspace between the eyes, percurrent, sulcate at and a little below the ocellus, sometimes to the base in the male, seriatly punctate laterally in black or fuscous; eyes moderately large, somewhat prominent in the male, distinctly longer than the infraocular portion of the genae; antennae rufotestaceous (male) or ferruginous (female), about four-fifths (male) or three-fifths (female) as long as the hind femora. Pronotum subequal, scarcely enlarging posteriorly, the disk nearly plane but feebly convex, passing by a well-rounded angle into the slightly tumid but vertical lateral lobes, the median carina distinct and sharp on the metazona, subobsolete on the prozona, the disk ferrugineo-testaceous, punctate with fuscous, especially in the female, the lateral lobes luteo-testaceous with a broad piceous band on the upper part of the prozona, in the female not infrequently broken in the middle by an oblique luteous stripe, and followed below on the posterior section of the prozona by a luteous patch; front border scarcely convex, hind border obtusangulate, the angle well rounded in the female; prozona quadrate or feebly longitudinal (male) or quadrate (female), slightly longer than the metazona. Prosternal spine feebly conical (male) or appressed conical (female), moderately long, rather slight, erect; interspace between mesosternal lobes fully twice as long as broad (male) or less than half as long again as broad (female). Tegmina reaching, occasionally slightly surpassing, the hind femora, moderately slender, feebly tapering, dark brownish fuscous, the discoidal area very feebly (male) or distinctly (female) maculate; wings moderately broad, hyaline, the veins and cross veins, except in the lower half of the anal area, blackish fuscous with a glaucous tinge. Hind femora fusco-ferruginous, the

outer face largely blackish fuscous, mesially interrupted narrowly with a very oblique luteo-testaceous cloud, giving it a broadly and very obliquely bifasciate appearance, intensified by the bifasciation of the upper surface and upper portion of the inner face; beneath luteo-rufescent or pale carmine; hind tibiae bright red, or less frequently greenish glaucous, with a subpatellar fuscous spot, the spines black except at base, ten to twelve in number in the outer series. Extremity of male abdomen feebly clavate, a little upturned, the supraanal plate triangular, acutangulate at tip, the sides full at base, throughout tilted upward, the median sulcus percurrent, deep, rather broad, the sharply tectate walls fading apically; furcula consisting of a pair of slight and delicate, divergent, acuminate fingers, not depressed, rarely reaching a third way across the supraanal plate; cerci rather small, hardly more than three times as long as broad, tapering gently in the basal half, beyond equal, and this portion bent a little inward and feebly sulcate externally, the apex well rounded; subgenital plate rather small, broad at base, apically as broad as long, the apical margin abruptly and slightly elevated but not prolonged, a little compressed and notched.

Length of body, male, 19.5 mm., female, 19 mm.; antennae, male, 8 mm., female, 6 mm.; tegmina, male, 13.5 mm., female, 12.5 mm.; hind femora, male, 10 mm., female, 10.5 mm.

Twenty-eight males, 23 females. Mountains near Lake Tahoe, Placer County, California, September, October, Henshaw, Wheeler's Expedition, 1876; Placer County, California, September (U.S.N.M.—Riley collection); Truckee, Nevada County, California, October 10.

31. MELANOPLUS WATER, new species.

(Plate XIII, fig. 2.)

Very dark brownish fuscous with a feeble ferruginous tinge. Head not prominent, dull fusco-olivaceous, delicately blotched with fuscous. above wholly fuscous, with a broad, piceous, postocular band; vertex gently tumid, feebly elevated above the pronotum, the interspace between the eyes slightly (male) or considerably (female) broader than the first antennal joint; fastigium very declivent, rather (female) or very (male) sulcate throughout; frontal costa hardly percurrent, especially in the male, a little contracted above, below broader than (male) or fully as broad as (female) the interspace between the eyes, shallowly sulcate at and, in the male, below the ocellus, punctate throughout; eyes moderately large, not very prominent, distinctly longer than the infraocular portion of the genae; antennae rufo-testaceous, in the male about two-thirds as long as the hind femora. Pronotum rather short, feebly expanding posteriorly, the lower part of the lateral lobes more or less tinged with luteous, the upper half of the prozona with an obscure fusco-piceous or fuscous band, the disk nearly plane but slightly tectate on the prozona, the median carina percurrent but

feebler on the prozona than on the metazona and more or less obsolete between the sulci, the disk passing into the lateral lobes by a well-rounded angle, becoming a tolerably distinct lateral carina on the metazona, the front margin subtruncate, the hind margin obtusangulate; prozona quadrate (male) or slightly transverse (female), scarcely if any longer than the finely punctate metazona. Prosternal spine short, erect, conico-cylindrical, feebly (male) or considerably (female) appressed, blunt; interspace between mesosternal lobes somewhat less than twice as long as broad (male) or feebly transverse (female). Tegmina dark brownish fuscous, almost equally opaque throughout, with distinct maculation in the discoidal field, reaching (male) or falling somewhat short of (female) the tips of the hind femora, not very slender, distinctly tapering, well rounded apically. Hind femora fusco-testaceous, rather obscurely and broadly fasciate with blackish fuscous, the inferior face ferruginous; hind tibiae obscure pale green, with an obscure fuscous basal annulus and often more or less flecked with fuscous, the spines black or brown with pallid base, ten to eleven in number in the outer series. Extremity of male abdomen clavate, somewhat upturned, the supraanal plate somewhat long triangular, with slightly convex and gently elevated lateral margins, a slightly produced acutangulate apex (its production not shown in the figure), a rather slender, not very deep, percurrent, median sulcus, with sharp but not high walls, and a pair of parallel, slight, short, apical ridges; furcula consisting of a pair of subparallel, flattened, tapering, acuminate fingers reaching nearly to the middle of the supraanal plate; cerci small and slender, subequal but mesially contracted laminae, nearly four times as long as broad, very faintly upcurved, apically a trifle incurved and well rounded, the external face distinctly punctate and apically feebly dimpled, with a very slight inward directed flange from the lower margin apically, the whole falling far short of the tip of the supraanal plate; infracercal plates rather broad and sulcate, but concealed by the recumbent cerci except apically, as they are a little larger than the supraanal plate; subgenital plate small, longer than broad, the apical margin transverse, somewhat elevated but not prolonged, thickened and distinctly notched.

Length of body, male, 18.75 mm., female, 19.5 mm.; antennae, male, 7 mm.; tegmina, male, 14.5 mm., female 13 mm.; hind femora, male, 10.5 mm., female, 12 mm.

Two males, 3 females. San Francisco, California, October, November (L. Bruner; S. H. Scudder).

This species is very closely related to the last, and with larger material may prove to be the same; but the anal cerci are faintly larger apically than mesially in the present form, while in *M. sierranus* they retain apically their mesial narrowness.

32. MELANOPLUS DEVASTATOR.

(Plate XIII, figs. 3-7.)

Melanoplus devastator SCUDDER! (pars), Proc. Bost. Soc. Nat. Hist., XIX (1878), pp. 285-286, 287-288; (pars), Entom. notes, VI (1878), pp. 46-47, 48-49; (pars), Rep. U. S. Ent. Comm., II (1880), App., p. 24, pl. XVII, figs. 2, 3, 19, 20.—? BRUNER, *ibid.*, III (1883), p. 60;? Bull. Div. Ent. U. S. Dep. Agric., II, (1883), p. 11;? *ibid.*, IV (1884), p. 58; (pars), Bull. Washb. Coll., I (1885), p. 138.—RILEY, Ent. Amer., I (1885), p. 177; Rep. U. S. Ent., 1885 (1886), pp. 229-232, pl. VIII, figs. 1-5 a-c.—COQUILLET, *ibid.*, 1885 (1886), pp. 291-295, 297.—? BRUNER, *ibid.*, 1885 (1886), pp. 306, 307.—COQUILLET, Ins. Life, I (1889), p. 227.—? RILEY, *ibid.*, II, (1889), p. 27.—BRUNER, Can. Ent., XXIII (1891), p. 193; Ins. Life, IV (1891), p. 21; Rep. Ent. Soc. Ont., XXII (1891), p. 48.—COQUILLET, Ins. Life, V (1892), pp. 22-23; Bull. Div. Ent. U. S. Dep. Agric., XXVII (1892), pp. 35-57.—BRUNER, *ibid.*, XXVIII (1893), pp. 22-24, figs. 10 a-d, 11 a-c; Rep. Nebr. St. Bd. Agric., 1893 (1893), p. 460, fig. 102; Rep. St. Hort. Soc. Nebr., 1894 (1894), pp. 163, 205, fig. 70; *ibid.*, 1895 (1895), p. 69.

Melanoplus affinis COQUILLET!, Ins. Life, I (1889), p. 227.

Caloptenus devastator RILEY, Bull. Div. Ent. U. S. Dep. Agric., XXV (1891), pp. 28-30, figs. 6 a-d, 7 a-c.—MILLIKEN, Ins. Life, VI (1893), p. 19.

Varying from dark brownish fuscous to ferrugineo-testaceous. Head feebly prominent, more or less livid testaceous, above darker, sometimes completely blackish fuscous, sometimes blackish fuscous in a median posterior stripe, and always with a fuscous or blackish postocular band; vertex somewhat tumid, especially in the male, raised well above the level of the pronotum, the interspace between the eyes moderate, fully as broad as (male) or much broader than (female) the first antennal joint; fastigium strongly declivent, deeply (male) or shallowly (female) sulcate throughout; frontal costa pereurrent, rather broad, broader than (male) or as broad as (female) the interspace between the eyes, subequal but a little contracted at its upper extremity, feebly sulcate about the ocellus, punctate throughout, but especially laterally; eyes pretty large, not very prominent even in the male, distinctly longer than the infraocular portion of the genae; antennae about two-thirds (male) or but little more than half (female) as long as the hind femora, varying from luteous to ferruginous, often a little infuscated, especially apically. Pronotum feebly enlarging posteriorly, faintly constricted mesially, the lateral lobes a little lighter colored than the disk, except for the broad piceous band above, which extends across the prozona, occasionally a little broken; front margin faintly convex, hind margin a little obtus-angulate, the median carina distinct on the metazona only, subobsolete between the sulci; lateral carinae feebly indicated in the abrupt but rounded angle by which the disk passes into the lateral lobes; prozona quadrate or longitudinally subquadrate in both sexes, but little or no longer than the faintly punctate metazona. Prosternal spine not very long, moderately stout, cylindrical, blunt, erect, a little shorter and a little appressed in the female; interspace between mesosternal lobes much more than twice (male) or slightly (female) longer than

broad. Tegmina a little surpassing the hind femora, at least in the male, only moderately slender, tapering a little, well rounded apically, fuscous, generally very dark fuscous, the discoidal area maculate in a very variable degree, from a feeble indication only (in which case the whole surface of the tegmina is generally exceptionally dark) to a heavy and coarse or a pronounced, rather delicate and distant flecking; wings moderately broad, hyaline, with fuscous veins and cross veins more or less tinged with glaucous, and becoming wholly glaucous in the anal area. Hind femora dull testaceous, very obliquely and broadly bifasciate with blackish fuscous and with a basal patch of the same on the outer and upper faces, the lower face and lower half of the inner face red or reddish; hind tibiae either dark glaucous, or red, or luteo-glaucous, often more or less infuscated in threads basally, generally deepening there in color, and when deepest often with a narrow, pale, subbasal annulus; the spines black, except their pallid base, ten to eleven, rarely twelve, in number in the outer series. Extremity of male abdomen oblong clavate, considerably upturned, the supraanal plate triangular, with subrectangulate apex, convex and broadly upturned lateral margins, a deep and narrow, percurrent, median sulcus, bounded by high walls, and a pair of slight and short apical ridges; furcula consisting of a pair of parallel, flattened, rather slight, tapering, acuminate fingers, hardly reaching a third way across the supraanal plate; cerci small, slender, subequal but feebly tapering in basal half, very feebly up-curved and as feebly incurved, about four times as long as broad, the apical third or less externally excavate, the tip well rounded, the whole much shorter than the supraanal plate; subgenital plate moderately broad at base, longer than broad, the apical margin considerably and rather abruptly elevated, but not prolonged, and slightly notched mesially.

Length of body, male, 21 mm., female, 24 mm.; antennae, male, 7.75 mm., female, 6.25 mm.; tegmina, male, 16.5 mm., female, 16 mm.; hind femora, male, 11.75 mm., female, 12 mm.

Eighty-two males, 58 females. Wenas, Yakima County, Washington (Museum Comparative Zoology); California (L. Pruner); California, H. Edwards; California, Ricksecker (S. Henshaw); Siskiyou County, California (U.S.N.M.—Riley collection); Sissons, Siskiyou County, California, Packard; Fort Redding, Shasta County, California, Lieutenant Williamson; Tehama County, California (U.S.N.M.—Riley collection); Lakeport, Lake County, California, Crotch; Sierra Valley, Sierra County, California, Lemmon, August (U.S.N.M.—Riley collection); Placer County, California, August, September (same); Colfax, Placer County, California, October 11; Clarkson, Eldorado County, California, July 14 (U.S.N.M.—Riley collection); Calaveras County, California (same); Marble Valley and White Rock, Amador County, California, July 14, 15 (same); Sacramento County, Coquillett (same); Folsom, Sacramento County, California, July 3 (same); Natoma, Sacramento

County, July 2 (same); Marin County, California, August (same); Sanzualito, Marin County, California, Behrens; San Francisco, California, September, October 15, November (U.S.N.M.—Riley collection; S. H. Scudder; Museum Comparative Zoology); Alameda, California, December 15 (U.S.N.M.—Riley collection); Merced County, California (same); Atwater, Merced County, California, July 29, Coquillett (same); Los Angeles, California, June, August, in coitu September 20, Coquillett, October 24 (same: S. H. Scudder); Pasadena, Los Angeles County, California, October 23; Tighes, San Diego County, California, Palmer; Southern California, Coquillett (U.S.N.M.—Riley collection).

The species has also been reported from various other counties in California, mostly in the central portions of the State, such as Fresno, Yuba, Napa (Riley), Sutter, San Joaquin (Coquillett), and Lake Tahoe, Placer County (Scudder), as well as from districts immediately adjoining California, as the adjacent parts of Oregon (Bruner), Reno, Washoe County, and Glen Brook, Douglas County, Nevada (Scudder), and Arizona (Bruner).

It has also been stated to occur in Colorado (Scudder), Kansas, North Dakota, northwest Wyoming, and Montana (Bruner), Idaho (Bruner, Milliken), and in Utah in the Salt Lake Valley (Scudder) and Nephi, Juab County (Riley); but certainly in some, and probably in all these cases, the insect reported was mistakenly supposed to be this species.

Coquillett describes a dipterous parasite, *Sarcophaga opifera*, as found in this species, and gives in the Twenty-seventh Bulletin of the Entomological Bureau at Washington a full account of the ravages of this locust in California, where they appear to do most damage to vineyards and to deciduous fruit trees, the latter of which always suffer the most in the vicinity of grain fields, upon which the migrating swarms appear always to descend, attracted, perhaps, by their color. Grain, however, appears to suffer relatively little at their hands, though alfalfa proves attractive.

A description of the colors of the living young, by Mr. Coquillett, will be found in the report of the United States Entomologist for 1885, page 293.

The species is an exceedingly variable one, and with limited material it would be difficult to believe that there was but a single species, so widely different is the appearance of the extremes. This, I suspect, will prove partly dependent upon station, though the different forms into which I would provisionally separate the species appear to be found indifferently in almost all parts of the State, though, as far as the collections before me show, all appear to be more abundant in the central and northern portions.

There is first the dark and rather small form, which is prevalent about San Francisco, and which may be called *M. d. obscurus* (Plate XIII, figs. 3, 4). It is also found in Sierra, Placer, Marin, Sacramento, Eldorado, and Alameda counties, as well as in Siskiyou County, in the

north, and Los Angeles County, in the south. The typical forms are very dark, having tegmina surpassing but little the hind femora, with meager maculation of the discoidal area, rarely at all cinereous in the basal half; the hind tibiae are variable in color.

A second form, which appears to be the widest spread, occurring in nearly every county in which the species has been found, from Shasta to San Diego and from Marin to Sierra, is of a decidedly cinereous aspect, with abundant and generally rather confused maculation in the discoidal area of the tegmina, which usually much surpass the hind femora; the hind tibiae are variable, but rarely glaucous. This form best represents the original types of the species when first described, and being also the most common may bear the name *M. d. typicalis* (Plate XIII, fig. 5). It is of medium size.

The third form is also of medium size and is very closely related to the last, and often hardly distinguishable. It may be called *M. d. affinis*¹ (Plate XIII, fig. 6). It differs principally by its shorter tegmina, which rarely surpass the hind femora, and which are very sharply maculate, with well-defined spots, and the hind tibiae are usually glaucous, occasionally luteous. I have seen specimens from Sierra, Sacramento, and Los Angeles counties.

The fourth form is by far the largest and the most heavily marked of all, besides being of a rather light tint, in which the dark maculations appear with the greater distinctness, and it may accordingly be known as *M. d. conspicuus* (Plate XIII, fig. 7). It appears much like an exaggerated form of the last-mentioned type, and has a more prominent head, much longer tegmina, which well surpass the hind femora, and ample wings, so that I suspect the migrating flights will be found to be composed mainly or exclusively of this form; the pronotum is unusually clear of lateral markings, and the hind tibiae are pale glaucous. It has not been found south of the center of the State (nor have any migratory hordes been reported there), and indeed only in the central portions and the elevated districts, namely, in Sacramento, Eldorado, Amador, and Merced counties.

33. MELANOPLUS VIRGATUS, new species.

(Plate XIII, fig. 8.)

Melanoplus devastator SCUDDER! (pars), Proc. Bost. Soc. Nat. Hist., XIX (1878), pp. 285-286, 287-288; (pars), Entom. Notes, VI (1878), pp. 46-47, 48-49.

Pezotettix virgatus MCNEILL!, MS.

Light testaceo-fuscous, more or less ferruginous above. Head moderately large and rather prominent luteo-testaceous, clouded with fuscous, above much infuscated, especially along the middle line posteriorly, and with a postocular piceous band sharply delimited below

¹The form supposed by Coquillett (see synonymy) to be Bruner's *M. affinis* is not this, but *M. d. typicalis*.

by luteous; vertex rather tumid, considerably elevated above the pronotum, the interspace between the eyes fully as broad as (male) or considerably broader than (female) the first antennal joint; fastigium steeply declivent, rather shallowly sulcate even in the male; frontal costa hardly reaching the clypeus, slightly narrowed above to meet the fastigium, otherwise subequal, broad, slightly broader than the interspace between the eyes, feebly sulcate or depressed at the ocellus, punctate, seriatly at the sides above; eyes moderately large, not very prominent, distinctly longer than the infraocular portion of the genae; antennae luteous, apically becoming slightly ferruginous or fuscous, more than two-thirds (male) or about three-fifths (female) as long as the hind femora. Pronotum very feebly flaring anteriorly to receive the head, somewhat enlarging posteriorly, the disk passing by a blunt angle into the lateral lobes, the former brownish fuscous, more or less distinctly ferruginous, the latter passing from luteo-testaceous below to fuscous above, the prozona with a broad piceous band which is obliquely cut by a distinct, posteriorly narrowing, sometimes feebly arcuate, luteous stripe, which connects with the luteous field just below the postocular band of the head, a feature more prominent in the female than in the male; median carina percurrent, often black, hardly less distinct on the prozona than on the metazona; front margin feebly convex, often with a slight median emargination; hind margin obtus-angulate, often nearly rectangulate; prozona slightly longitudinal (male) or quadrate (female), distinctly (male) or hardly (female) longer than the closely punctate metazona. Prosternal spine moderately long, cylindrical, feebly appressed, very blunt (male) or short, conical, appressed, blunt (female), erect; interspace between mesosternal lobes more than twice (male) or only a little (female) longer than broad. Tegmina surpassing more or less, generally considerably, the hind femora, moderately slender, distinctly tapering, brownish fuscous, with distinct quadrate black maculation in the discoidal area. Hind femora testaceous, sometimes tinged with ferruginous, broadly and obliquely bifasciate with blackish fuscous, with a basal patch of the same, the under surface luteous, sometimes faintly flushed with orange; hind tibiae very pale green, becoming more or less pallid or luteous at either extremity, the spines black, except basally, nine to twelve, usually ten to eleven, in number in the outer series. Extremity of male abdomen elongate-clavate, a little upturned, the supraanal plate long triangular, with lateral margins full at the base and scarcely elevated, acutangulate apex, and slender, rather shallow, median sulcus, bounded by rather slight but distinct walls; furcula consisting of a pair of slender, flattened, parallel fingers, subequal in basal half, beyond much narrowed and acuminate, reaching almost to the middle of the supraanal plate; cerci slender, slight, tapering feebly in basal half, about four times as long as broad, apically well rounded, very feebly incurved, hardly upcurved, the outer surface punctate and

apically dimpled, with a slight, inferior, indirected flange to the lower margin apically, the whole much shorter than the supraanal plate; infracercal plates extending noticeably beyond the supraanal plate and so exposed beyond the tips of the cerci to a considerable degree; subgenital plate longer than broad, broad and rectangular at base, apically elevated but not prolonged, the apical border thickened and emarginate.

Length of body, male, 20.5 mm., female 22.5 mm.; antennae, male, 8.5 mm., female, 8 mm.; tegmina, male, 17 mm., female, 17.5 mm.; hind femora, male, 11.5 mm., female, 13 mm.

Eleven males, 12 females. California, H. Edwards; Siskiyou County, California, July (U.S.N.M.—Riley collection); Fort Redding, Shasta County, California, Lieutenant Williamson; Butte County, California (U.S.N.M.—Riley collection); Sierra Valley, Sierra County, California, J. G. Lemmon (same); Sacramento County, California, Coquillett (same); J. McNeill).

34. MELANOPLUS UNIFORMIS, new species.

(Plate XIII, fig. 9.)

Melanoplus devastator SCUDDER! (pars), Proc. Bost. Soc. Nat. Hist., XIX (1878), pp. 285-286, 287-288; (pars), Entom. Notes, VI (1878), pp. 46-47, 48-49.

Light and nearly uniform testaceous, more or less feebly tinged above with ferruginous. Head somewhat prominent, particularly in the male, pallid testaceous, darker above, with occasionally a feeble postocular fuscous line at the upper limit of the normal Melanoplan postocular band; vertex tumid, well elevated above the pronotum, the interspace between the eyes rather broad, half as broad again (male) or twice as broad (female) as the first antennal joint; fastigium strongly declivent, sulcate throughout, more deeply and narrowly in the male than in the female; frontal costa broad, subequal, scarcely attaining the clypeus, fully as broad as the interspace between the eyes, feebly impressed about the ocellus, punctate throughout; eyes large, rather prominent, much larger than the infraocular portion of the genae; antennae luteous, growing slightly fulvous apically, nearly two-thirds (male) or scarcely more than half (female) as long as the hind femora. Pronotum feebly enlarged posteriorly, the lateral lobes slightly paler than the disk, and rarely with a few faint dusker streaks in the place of the postocular band, the disk passing into the lateral lobes by a rounded shoulder, which almost develops into a lateral carina on the metazona; median carina slight, percurrent, only slightly feebler on the prozona than on the metazona; front margin subtruncate, hind margin obtusangulate; prozona quadrate (male) or slightly transverse (female), scarcely or not longer than the closely and finely punctate metazona. Prosternal spine not very long, conico-cylindrical, appressed, blunt, blunter in the female than in the male, slightly retrorse; interspace between mesosternal

lobes nearly or quite twice as long as broad in both sexes. Tegmina uniform light yellowish testaceous, with no sign of maculation, although rarely a little beclouded, reaching somewhat, generally far, beyond the hind femora, rather slender, feebly tapering, well rounded at tip; wings pellucid, the veins and cross-veins sometimes wholly green, sometimes partly fuscous. Hind femora testaceous, generally feebly infuscated in the incisures of the outer face above, the inner half of the upper face often bimaculate with fuscous, the under surface with a tendency to become roseate, the genicular arc black; hind tibiae very pale dingy green, growing lutescent apically, the spines black with pallid base, ten to twelve, usually eleven, in number in the outer series. Extremity of male abdomen clavate, a little upturned, the supraanal plate subclypeate, with sinuate sides and rectangulate apex, with a short, shallow, median sulcus and feebly elevated sides, the whole surface nearly plane; furcula consisting of a pair of moderately broad, flattened, tapering, acuminate fingers, parallel or slightly divergent, reaching about to the middle of the supraanal plate; cerci slender, subequal but basally tapering, feebly incurved laminae, about five times as long as broad, feebly arcuate and apically well rounded, with a slight, inferior, indirected flange to the lower margin apically, the whole much shorter than the supraanal plate; infracercal plates as in the last species; subgenital plate about as broad as long, the lateral margin arcuate, being produced both basally and apically, but especially the latter, the apical margin rounded subquadrate, very feebly or not at all emarginate, though thickened on either side of the middle.

Length of body, male, 25 mm., female, 22.75 mm.; antennae, male, 8.5 mm., female, 6.25 mm.; tegmina, male, 21.5 mm., female, 18.5 mm.; hind femora, male, 13.25 mm., female, 12 mm.

Nine males, 8 females. Fort Redding, Shasta County, California, Lieutenant Williamson; Yuba County, California (U.S.N.M.—Riley collection); Sacramento County, California, Coquillett (same); Folsom, Sacramento County, California, July 4 (same); Merced County, California (same).

35. *MELANOPLUS ANGELICUS*, new species.

(Plate XIII, fig. 10.)

Of rather large size, dark brownish fuscous, more or less ferruginous. Head not very prominent, plumbeous or ferruginous, more or less infuscated, above hardly darker but perhaps with more fuscous patches, a postocular piceous band; vertex gently tumid, but little elevated above the pronotum, the interspace between the eyes rather broad, somewhat broader than the first antennal joint; fastigium strongly declivent, deeply sulcate throughout; frontal costa broad, feebly constricted above, percurrent, slightly broader than the interspace between the eyes, gently sulcate at and below the ocellus, punctate above seriatly

at the sides; eyes large, not very prominent, distinctly longer than the infraocular portion of the genae; antennae fulvo-testaceous, about two-thirds as long as the hind femora (male). Pronotum subequal, feebly enlarging posteriorly, the median carina distinct throughout, though the feebler on the prozona, the lateral carinae forming a tolerably distinct angle, especially on the metazona, the disk darker than the lateral lobes, but the latter having a clouded piceous band on the prozona, much broken. Luteous or ferruginous, and distinct only in the impressed portions; front margin faintly convex, hind margin obtusangulate, nearly rectangular; prozona quadrate, no longer than the closely punctate metazona. Prosternal spine short, appressed, conico-cylindrical, blunt, erect, stout; interspace between mesosternal lobes a little more than twice as long as broad (male). Tegmina greyish fuscous, very feebly and very sparsely sprinkled with fuscous dots in the discoidal field, considerably surpassing the hind femora, moderately slender, subequal, well rounded at tip; wings pellucid, with greenish fuscous veins. Hind femora dull testaceous, broadly, obliquely, and more or less distinctly bifasciate with dark olivaceo-fuscous, the under surface more or less ruddy; hind tibiae pale or obscure glaucous, the spines black and pallid, ten to thirteen, generally eleven, in number in the outer series. Extremity of male abdomen little clavate, a little upturned, the supraanal plate long triangular, with acuteangulate apex and slightly convex sides, the surface nearly flat, a moderately narrow, percurrent, median sulcus marked by the elevation of its not very sharp nor high walls; furcula consisting of a pair of parallel, flattened, not very broad, rather rapidly tapering, subacuminate fingers, hardly surpassing the basal third of the supraanal plate; cerci small, slender, feebly upcurved, gently incurved, equal except for the slight basal enlargement, well rounded at apex, distinctly less than four times as long as broad, and much shorter than the supraanal plate; infracercal plates as in the preceding species; subgenital plate broad and short, apically elevated abruptly and considerably but not prolonged, the apical margin transverse, thickened, and notched.

Length of body, male, 23.5 mm.; antennae, 9 mm.; tegmina, 20.5 mm.; hind femora, 14 mm.

Two males. Los Angeles, California, Coquillett (U.S.N.M.—Riley collection).

8. IMPUDICUS SERIES.

This group is composed of a single species of medium size, and is more nearly related to the next group than to any other. The prozona is slightly longitudinal in the male. The interspace between the mesosternal lobes in the same sex is nearly half as long again as broad and the metasternal lobes are only approximate. The tegmina are fully developed and surpass the hind femora. The hind tibiae are red and have eleven to thirteen spines in the outer series.

The supraanal plate is regularly triangular with straight sides and acutangulate apex, the surface entirely in the same plane from base to apex, i. e., with no apical depression. The furcula in the single known species is reduced to a pair of very slight rather distant spines, no longer than the last dorsal segment. The cerci taper considerably at base, but more by excision of the lower than of the upper margin, and beyond the middle are subequal, hardly in the least incurved, and apically angulate. The subgenital plate is of equal breadth throughout and terminates in a postmarginal blunt tubercle above, the apical margin being abbreviated, rounded, and entire.

The single species occurs in the Southern States, east of the Mississippi.

36. *MELANOPLUS IMPUDICUS*, new species.

(Plate XIV, fig. 1.)

Of medium size, brownish fuscous, with a decided ferruginous tinge. Head moderately prominent, testaceous or ferrugineo-testaceous, dotted above with fuscous, the dots mesially forming a stripe, and with a distinct postocular piceous band; vertex rather tumid, distinctly elevated above the pronotum, the interspace between the eyes as broad (male) or fully half as broad again (female) as the first antennal joint; fastigium steeply declivent, feebly (male) or very feebly (female) sulcate; face more than usually retreating, the frontal costa failing to reach the clypeus, equal, as broad (male) or almost as broad (female) as the interspace between the eyes, sulcate excepting above where it is biserially punctate; eyes not very prominent, rather large, distinctly longer than the infraocular portion of the genae; antennae ferruginous, less than two-thirds (male) or about three-fifths (female) as long as the hind femora. Pronotum subequal, expanding a little on the metazona, the disk ferrugineo-luteous flecked with fuscous, very feebly convex, passing by a rounded shoulder nowhere forming lateral carinae into the anteriorly tumid vertical lateral lobes, which are of the color of the face, with a broad piceous postocular stripe across the prozona; median carina distinct on the metazona, feeble and in the female subobsolete on the prozona; front margin truncate; hind margin obtusangulate; prozona feebly longitudinal (male) or distinctly transverse (female), a little (male) or no (female) longer than the delicately punctate metazona. Prosternal spine rather long (male) or rather short (female), conical, rather blunt, suberect; interspace between mesosternal lobes nearly half as long again as broad in both sexes, the metasternal lobes approximate (male) or somewhat approximate (female). Tegmina surpassing a little (male) or considerably (female) the hind femora, moderately broad, tapering (more rapidly in the male than in the female), brownish fuscous, the discoidal area lighter at least on the basal half, and flecked throughout with tolerably large, more or less rounded, dark fuscous spots; wings rather broad, hyaline at base, beyond infumated

either apically (female) or over the whole apical half (male), the veins in the infumated area blackish fuscous. Fore and middle femora somewhat tumid in the male; hind femora ferruginous or ferrugineotestaceous, obliquely bifasciate with blackish fuscous excepting below, the under face lighter or deeper orange, the whole geniculation infuscated; hind tibiae bright red, the spines black excepting at base, eleven to thirteen in the outer series. Extremity of male abdomen a little clavate, slightly recurved, the supraanal plate triangular with straight, scarcely and narrowly elevated margins, acutangulate apex, the median sulcus confined to the basal half, tapering, narrow, and very deep, between high and sharp walls, which unite in the middle of the plate; furcula consisting of a pair of slight, brief, parallel, moderately distant spines lying upon the bases of the ridges of the supraanal plate; cerci small compressed laminae, tapering rapidly in the basal half and more rapidly beneath than above, beyond equal and about half as broad as extreme base, apically rounded angulate, nowhere incurved, scarcely so long as the supraanal plate; infracercal plates very broad at base, extending far outside the cerci, rapidly narrowing with straight margins, distinctly shorter than the supraanal plate; subgenital plate small, subequal or broader apically than basally, hardly longer than broad, bluntly subconical, terminating in a very blunt, heavy tubercle, which lies beyond the well rounded, scarcely elevated, entire, apical margin.

Length of body, male, 18.5 mm., female, 22.5 mm.; antennae, male and female, 8 mm.; tegmina, male, 16 mm., female, 20 mm.; hind femora, male, 11.5 mm., female, 13.5 mm.

One male, 2 females. Georgia, Morrison (S. H. Scudder; S. Henshaw); Monticello, Lawrence County, Mississippi, Miss Helen Jennison.

9. ARIDUS SERIES.

In this group the antennae of the male are exceptionally long and the prozona is distinctly longitudinal. The interspace between the mesosternal lobes in the same sex varies from subquadrate to half as long again as broad, while in the female it varies from distinctly transverse to much longer than broad. The pronotum is posteriorly truncate or subtruncate, usually broadly emarginate. The tegmina are not only abbreviate but rarely as long as the pronotum, lateral and distant. The hind femora are long, and the hind tibiae light colored, with eight to twelve, generally about ten, spines in the outer series.

The supraanal plate of the male is triangular and rather simple; the last dorsal segment is obliquely and deeply sulcate on either side of the base of the furcula, which consists of a pair of very slender parallel fingers or spines of variable length, but never very long; the cerci rapidly narrow at the base to a long and exceedingly slender incurved blade, hardly as long as the supraanal plate, and narrower by far than

the frontal costa; the subgenital plate is small and subconical or subpyramidal, the margins lying in one plane and entire.

Three species are known, two in Arizona, and one from near the margin of the tropics in western Mexico and Lower California. They are rather above the medium and may be of large size.

37. MELANOPLUS HUMPHREYSII.

Pezotettix humphreysii THOMAS! (pars), Rep. Geogr. Expl. 100th mer., V (1875), p. 890.—SCUDDER! (pars), Proc. Ent. Soc. Nat. Hist., XX, 1879, p. 85; (pars), Cent. Orth. (1879), p. 74.

The only specimen seen has been in alcohol and the colors are more or less bleached; it is brownish testaceous, marked with black. Head large, somewhat protuberant, without markings except a slender black line behind the eye; vertex somewhat tumid and a little elevated above the pronotum, sharply punctate except in a posteriorly broadening mesial band which was probably darker colored, the interspace between the eyes much broader (a little distorted in the specimen) than the first antennal joint; fastigium rather steeply declivent, rather narrow, sulcate, biserially punctate; frontal costa rather prominent above, fading before the clypeus, much broader than the interspace between the eyes. equal, shallowly sulcate excepting above, sparsely punctate; eyes of moderate size, not prominent, about as long as the infraocular portion of the genae; antennae testaceous, apically infuscated, less than two-thirds (female) as long as the hind femora. Pronotum very regularly and feebly enlarging posteriorly, the upper half of the lateral lobes of the prozona with a very large, posteriorly narrowing, piceous patch, nearly split in two subequal portions by a wedge of the basal color extending obliquely upward from the lower anterior corner, and narrowly edged above on the disk by a pallid tint; disk transversely convex, passing by a very rounded and scarcely perceptible angle into the very steeply declivent and inferiorly vertical lateral lobes, with no lateral carinae; median carina percurrent, feeble on the metazona, coarse and rather prominent on the prozona; front margin truncate but feebly and narrowly flaring; hind margin roundly, broadly and feebly emarginate; disk of prozona very coarsely punctate, quadrate, fully a third as long again as the strongly transverse, finely punctate metazona. Prosternal spine short, conical, blunt; interspace between mesosternal lobes (female) distinctly transverse, narrower than the lobes. Tegmina abbreviate, shorter than the pronotum, lateral, widely separated, enlarging from the base to the middle, beyond equal, apically rounded, several times longer than broad, black on ground with testaceous veins. Hind femora brownish testaceous on upper half, its lower limit infuscated on the outer face, pallid on lower half, the genicular arc black; hind tibiae pale testaceous, the spines black tipped, nine to ten in number in the outer series. Supraanal plate of male "bicarinately longitudinally"; cerci "flat and enlarged at the base and apex, the apical

portion being somewhat broader than the basal portion; the anterior apical angle is rounded, while the posterior one is somewhat acute, dentiform;" subgenital plate "slightly elongate and cone-shaped" (Quotations from Thomas).

Length of body, female, 26 mm.; antennae, 11 mm. (est.); tegmina, 5 mm.; hind femora, 18 mm.

One female. Arizona, G. W. Dunn (L. Bruner). It was originally described from southern Arizona.

I have here adhered to my original limitation¹ of Thomas's species, although I was mistaken in supposing that the male I then had before me was one of those used by him in his description, since he describes the cerci as enlarged at the extremity, which they certainly were not in the one then in my hands. Thomas's originals, so far as now preserved in the National Museum, all belong to my *Mel. aridus*, but fortunately a specimen in Professor Bruner's collection, although it is only a female, enables me to fix the species. It may be separated from *Mel. aridus* by the character which Thomas describes thus: "Posterior margin [of pronotum] truncate on the back [i. e., disk], or curved slightly forward" [i. e., emarginate], the posterior margin in *Mel. aridus* being distinctly obtusangulate, though subtruncate.

38. MELANOPLUS NITIDUS, new species.

(Plate XIV, fig. 2.)

Pezotettix humphreysii SCUDDER! (pars), Proc. Bost. Soc. Nat. Hist., XX (1879), p. 85; (pars), Cent. Orth. (1879), p. 74.

Pale brown suffused with flavous and marked with black. Head not prominent, or in the male scarcely prominent, pale flavo-testaceous heavily mottled with brown, above almost wholly brown, with a broad postocular piceous band margined with flavous (these markings not seen in the female); vertex tumid, distinctly elevated above the pronotum (male) or feebly tumid, not thus elevated (female), the interspace between the eyes nearly half as broad again as the first antennal joint; fastigium rather strongly declivent, deeply (male) or feebly (female) sulcate; frontal costa subequal, but slightly expanded at the ocellus, where it is equal to (male) or broader than (female) the interspace between the eyes, sulcate distinctly and throughout (male) or feebly and at and a little below the ocellus (female); eyes rather large and rather prominent especially in the male, elongate, very much longer than the infraocular portion of the genae; antennae flavous, a little shorter than (male) or about two-thirds as long as (female) the hind femora. Pronotum subequal on the prozona, expanding on the metazona, nearly uniform in coloring except for a large flavous-margined, piceous, postocular patch crossing the prozona, more or less broken and irregular in the female; disk pretty strongly convex, passing almost insensibly into the lateral lobes with no trace of lateral carinae, though the position of these is

¹Proc. Bost. Soc. Nat. Hist., XX, p. 85.

marked on the prozona by the flavous stripe bordering the piceous patch; median carina percurrent, dull and heavy, more pronounced on the prozona than on the metazona; front margin subtruncate, feebly and narrowly flaring in the male, hind margin broadly and roundly but not deeply emarginate; prozona punctate next the front margin, distinctly longitudinal (male) or quadrate (female), mesially twice as long (male) or fully half as long again (female) as the finely punctate metazona. Prosternal spine appressed conical and slightly retrorse (male) or erect, conical (female), rather long and slender; interspace between mesosternal lobes transversely subquadrate (male) or a little transverse (female), the metasternal lobes subattingent (male) or somewhat approximate (female). Tegmina about as long as the prozona, elliptical, about three times as long as broad, broadly rounded at tip, lateral, widely distant, black with testaceous veins. Fore and middle femora somewhat enlarged especially in depth in the male; hind femora flavous, more or less longitudinally infuscated or ferruginous, especially on or next the carinae, the genicular arc piceous, the lower genicular lobe wholly pallid; hind tibiae pale dull flavous, delicately mottled with ferruginous, the spines black excepting at base, eight (female) or ten (male) in number in the outer series. Abdomen feebly carinate, nearly uniform in color, the extremity subclavate in the male, a little recurved, the supraanal plate triangular, roundly acutangulate at tip, the surface vaulted, with a large subbasal rounded basin taking the place of the usual median sulcus, and into which falls the furcula, consisting of a pair of very slender, parallel and adjacent, subequal, cylindrical fingers, extending less than a third the distance across the plate; cerci slender, gradually incurved but otherwise straight, compressed blades, tapering at the very base, but beyond subequal, rounded at tip, considerably shorter than the supraanal plate; subgenital plate small, subpyramidal, of about equal breadth and length, the margin apically angulate, entire.

Length of body, male, 17.5 mm., female, 31.5 mm.; antennae, male and female, 11 mm.; tegmina, male, 3 mm., female, 5 mm.; hind femora, male, 12 mm., female, 17 mm.

One male, 1 female. Tepic, Jalisco, Mexico, November, Coll. Calif. Acad. Sc. (L. Bruner); Cape St. Lucas, Lower California (?), J. Xantus.

The female, collected by Xantus (presumably at Cape St. Lucas), is the one referred to by me in my original description of *M. aridus* as belonging to that species, but it differs from it (and agrees with *M. humphreysii*) in the emargination of the posterior border of the pronotum, and differs from both in the greater robustness of the body, especially in the metathoracic region. It is quite possible that the male and female here brought together do not properly belong to one species; there is great disparity in size and, as the description shows, some unusual disagreements between sexes of the same species; but they certainly belong in close proximity, even if distinct; if they should prove distinct, the name should be retained for the male, from which the description (especially in colors) has principally been drawn.

39. MELANOPLUS ARIDUS.

(Plate XIV, fig. 3.)

Pezotettix humphreysii THOMAS! (pars), Rep. Geogr. Expl. 100th mer., V (1875), p. 890, pl. XLV, figs. 1, 2.

Pezotettix aridus SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), pp. 84-85; Cent. Orth. (1879), pp. 73-74.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.

Brownish flavous, inclining to flavous below, marked with black. Head slightly prominent especially in the male, more or less embrowned, with a narrow mesial black stripe on summit and a broad postocular piceous band; vertex rather tumid, distinctly elevated above the pronotum, the interspace between the eyes slightly narrower (male) or slightly broader (female) than the first antennal joint; fastigium steeply declivent, sulcate, narrow, considerably expanding in front, the bounding walls stout, rounded; frontal costa moderate, nearly equal, contracted slightly just below the ocellus, above flat, below the ocellus a little sulcate, rather broader than the interspace between the eyes; eyes rather prominent especially in the male, as long as (female) or distinctly longer than (male) the infraocular portion of the genae; antennae flavo-testaceous, about five-sixths (male) or two-thirds (female) as long as the hind femora. Pronotum simple, expanding a very little posteriorly, the prozona slightly swollen on the upper part of the lateral lobes, into which the disk passes insensibly; there is a broad black band at the upper limit of the lateral lobes of the prozona, which either narrows on the metazona so as only to edge the lower side of the position of the lateral carinae, or, if of equal width with the preceding portion, is enlivened by a yellow stripe passing longitudinally through the middle, a continuation of the black bordered yellowish stripe on the metathoracic epipleura; occasionally the band is wholly obsolete on the metazona; in the middle of the portion of the band on the prozona is also a roundish or oblique pyriform yellowish spot; median carina distinct, equal, but low and rounded; front margin truncate, hind margin gently convex, subangulate; prozona obscurely and sparsely punctate, distinctly (male) or very feebly (female) longitudinal, a third (male) or a fourth (female) longer than the finely and clearly punctate metazona. Prosternal spine not very long, conical, blunt-tipped, suberect; interspace between mesosternal lobes fully (male) or nearly (female) half as long again as broad. Tegmina abbreviate, shorter or at least no longer than the pronotum, rounded ovate, about twice as long as broad, the costal and inner margins about equally convex, the extremity truncate and broadly rounded, not in the least produced, dark brownish fuscous, clouded with olivaceous. Fore and middle femora very gently tumid in the male; hind femora dull olivaceous flavous, the outer face more or

less infuscated, the upper face indistinctly bimaculate with fuscous, the whole geniculation excepting the lower lobe beyond its base blackish; hind tibiae glaucous (pale yellowish in alcoholic specimens), the spines black to their base, or excepting the extreme base, ten to eleven, rarely twelve, in number in the outer series. Extremity of male abdomen very feebly clavate, scarcely recurved, the supraanal plate triangular, about equally long and broad, the sides straight, the tip angulate; furcula consisting of a pair of subapproximate slight and equal fingers, bluntly tipped, hardly more than a quarter the length of the supraanal plate; cerci very slender, compressed, rapidly narrowing at extreme base, beyond equal, slightly and broadly sulcate exteriorly, directed backward and a little inward, tapering and bluntly rounded at tip, scarcely reaching the tip of the supraanal plate; subgenital plate truncato-conical, much broader than long, incurved at base, the lateral and apical margins in one plane, entire.

Length of body, male, 17.5 mm., female, 21 mm.; antennae, male, 10.5 mm., female, 8.5 mm.; tegmina, male, 4 mm., female, 4.5 mm.; hind femora, male, 12.5 mm., female, 13 mm.

Four males, 9 females. Arizona (U.S.N.M.—Riley collection; L. Bruner); San Carlos, Gila County, Arizona, Wheeler's Exp. (U.S.N.M.—Riley collection); Fort Whipple, Yavapai County, Arizona, E. Palmer; Fort Buchanan, Pima County, Arizona, E. Palmer; Fort Grant, Graham County, Arizona (U.S.N.M.—Riley collection).

See the remarks on this species under *Melanoplus humphreysii*. A specimen from Cape St. Lucas which I referred¹ to this species does not belong to it, but probably to *Melanoplus nitidus*.

10. INDIGENS SERIES.

In this group, consisting of only a single species of medium size, the prozona of the male is very longitudinal and the interspace between the mesosternal lobes of the same sex only slightly longer than broad. The antennae of the male are almost as long as the hind femora. The tegmina are abbreviate, about as long as the pronotum, subelliptical with rounded apex. The hind tibiae are greenish and have ten to twelve spines in the outer series.

The extremity of the male abdomen is hardly clavate and the supraanal plate triangular with distinct median sulcus and mesially notched lateral margins; the furcula consists of a small pair of tapering fingers; the cerci are large and broad, almost equally broad throughout, and apically rounded, nearly straight; the subgenital plate is broad and short, the apical margin elevated to a blunt tubercle.

The single species occurs in Idaho.

¹Proc. Bost. Soc. Nat. Hist., XX, p. 85.

40. MELANOPLUS INDIGENS, new species.

(Plate XIV, fig. 4.)

Of medium size, brownish fuscous above, sordid testaceous beneath. Head a little prominent, olivaceo-testaceous flecked with fuscous, above blackish fuscous with a broad piceous postocular band; vertex somewhat tumid, scarcely elevated above the pronotum, the interspace between the eyes half as broad again as the first antennal joint; fastigium steeply declivent, shallowly and broadly sulcate; frontal costa scarcely reaching the clypeus, faintly expanded at the ocellus, but otherwise equal, a little narrower than the interspace between the eyes, a little sulcate below the ocellus, distinctly punctate above; eyes rather large, not prominent, somewhat longer than the infraocular portion of the genae; antennae castaneous, almost as long as the hind femora. Pronotum slightly expanding on the metazona, the sides with a percurrent, piceous, postocular stripe which is rather feeble on the metazona, the disk rather broadly convex, passing by a rounded shoulder, posteriorly forming feeble lateral carinae, into the somewhat tumid vertical lateral lobes; median carina distinct on the metazona, obsolescent on the prozona; front margin subtruncate, hind margin very broadly rotundate; prozona distinctly longitudinal, about a third longer than the finely punctate metazona. Prosternal spine long, conical, bluntly pointed, feebly appressed; interspace between mesosternal lobes subquadrate, barely longer than broad. Tegmina abbreviate, almost as long as the pronotum, slightly distant, obovate, almost twice as long as broad, the tip strongly rounded. Fore and middle femora somewhat tumid in the male; hind femora rather slender, somewhat compressed, ferrugineo-testaceous, irregularly clouded and flecked with fuscous, the under face flavo-olivaceous, the upper genicular lobe and base of lower black; hind tibiae sordid pale greenish with a fuscous patellar annulus, the spines black almost to their base, ten to twelve in number in the outer series. Extremity of male abdomen hardly clavate, somewhat recurved, the supraanal plate triangular with acutangulate apex, the lateral margins considerably and rather abruptly elevated and mesially notched, the median sulcus distinct and percurrent between rather narrow and sharp ridges which fade beyond the middle; furcula consisting of a pair of rather slender, tapering and acuminate, tumid, feebly arcuate and slightly divergent fingers, slightly longer than the last dorsal segment; cerci broad and rather coarse, straight, subequal, apically rounded or subangulate laminae, nearly four times as long as their middle breadth, obliquely vertical throughout except apically, where by a feeble twist they become vertical: subgenital plate short and broad, the apical margin rising considerably above the lateral into a slight rounded tubercle, the lateral and apical margins as seen from above parabolic.

Length of body, male, 20 mm.; antennae, 10 mm.; tegmina, 4.25 mm.; hind femora, 11 mm.

One male. Salmon City, Lemhi County, Idaho, August (L. Bruner).

This species has a close general resemblance to *Podisma marshallii* with its much shorter antennae and wide separation of the mesosternal lobes.

11. MANCUS SERIES.

In this group, composed of species mostly of small size, the prozona of the male varies from quadrate to distinctly longitudinal, and the interspace between the mesosternal lobes of the same sex varies from a little longer than broad to more than twice as long as broad. The antennae of the male are rarely as long as the hind femora. The tegmina are always abbreviate, about as long as the pronotum, usually rather broad and either angulate or more or less acuminate at tip. The hind tibiae are red, rarely greenish, and have nine to sixteen, more commonly about eleven, spines in the outer series.

The extremity of the male abdomen is usually very feebly clavate, and the supraanal plate usually triangular and rather flat except for the submedian ridges; but it is sometimes long subelypate with margins more or less raised; the furcula always consists of a feeble or rather feeble pair of denticulations; the cerci are generally rather small, sometimes nearly equal, at others tapering more or less in the basal half, but rarely anywhere very slender, generally incurved or inbent, and occasionally somewhat arcuate as seen laterally, always well rounded apically and generally exteriorly sulcate on the apical half; the subgenital plate is broad, generally also short, subconical or subpyramidal, the lateral and apical margins in the same plane and entire.

The species are five in number and have together a wide range, though all but one are rather local, so far as known. The one which is widely distributed occurs from Nebraska and Kansas to Texas in the West, and from southern New England and central New York to Virginia in the East. The other species are known respectively from Lower California, Colorado, Idaho, and northern New England, but the last is also reported from Illinois.

This series represents in brachypterous forms the glaucipes series in macropterous, and in an ideal arrangement the series should not be so widely separated as here.

41. MELANOPLUS SCUDDERI.

(Plate XIV, figs. 5, 6.)

Pezotettix scudderi UHLER!, Proc. Ent. Soc. Phil., II (1864), p. 555.—SMITH, Rep. Conn. Bd. Agric., 1872 (1872), pp. 370, 381.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 152; Bull. Ill. Mus. Nat. Hist., I (1876), p. 67.—BRUNER, Can. Ent., IX (1877), p. 144.—SCUDDER, *ibid.*, XII (1880), p. 75.—THOMAS, Rep. Ent. Ill., IX (1880), pp. 91, 95, 121.—BRUNER, Rep. U. S. Ent. Comm. III (1883), p. 59.—COMSTOCK, Intr. Ent. (1888), p. 107.—DAVIS, Ent. Amer., V (1889), p. 80.—SMITH, Cat. Ins. N. J. (1890), p. 412.—BLATCHLEY!, Can. Ent., XXIII (1891), p. 80.—MCNEILL!, Psyche, VI (1891), p. 76.—OSBORN, Proc. Iowa Acad. Sc., I, ii (1892), p. 117.—BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 27.—MORSE, Psyche, VII (1894), p. 106.—GARMAN, Orth. Ky. (1894), p. 8.—BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., VI (1894), p. 309, pl. VIII, fig. 6.

Pezotettix rubricerus WALSH!, MS. (1865).

Podisma scudderi WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 718.

Pezotettix unicolor THOMAS!, Rep. U. S. Geol. Surv. Terr., V (1873), p. 151; Proc. Dav. Acad. Nat. Sc., I (1876), p. 260.—GLOVER, Ill. N. A. Ent., Orth. (1876), pl. XIII, fig. 9.—THOMAS, Bull. Ill. Mus. Nat. Hist., I (1876), p. 66; Rep. Geol. Expl. W. 100th Mer., V (1875), p. 888, pl. XLV, fig. 4.—BRUNER, Can. Ent., IX (1877), p. 144.—RILEY, Rep. U. S. Ent. Comm., I (1878), pp. 220, 226.—THOMAS, Rep. Ent. Ill., IX (1880), pp. 95, 118-119.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59; Bull. Washb. Coll., I (1885), p. 136; Publ. Nebr. Acad. Sc., III (1893), p. 27.

Of medium or rather small size, ferrugineo-fuscous, a little lighter beneath. Head not prominent, dark testaceous, much mottled with fuscous or generally infuscated, above almost wholly infuscated, with an obscure fuscous postocular band; vertex somewhat tumid, scarcely elevated above the pronotum, the interspace between the eyes half as broad again (male) or twice as broad (female) as the first antennal joint; fastigium steeply declivent, plane, with feebly raised lateral margins; frontal costa fading before the clypeus, subequal, of the same breadth as the interspace between the eyes, the lateral margins faintly elevated throughout and besides that feebly sulcate at and below the ocellus, punctate biserially above; eyes moderately large, rather prominent, very much longer than the infraocular portion of the genae; antennae ferruginous, more or less infuscated apically, about four-fifths (male) or less than two-thirds (female) as long as the hind femora. Pronotum often heavily ferruginous on the disk, the lateral lobes with a postocular piceous belt, occasionally subobsolete, either crossing the whole pronotum but generally enfeebled on the metazona, or confined to the prozona; disk broadly convex, passing by a distinct but everywhere distinctly rounded shoulder into the at first very steeply declivent and afterwards vertical lateral lobes; median carina distinct, delicate and equal throughout; front margin very feebly convex and often faintly emarginate in the middle, hind margin obtusangulate, occasionally rotundato-obtusangulate; prozona distinctly longitudinal (male) or varying from quadrate to distinctly longitudinal—the latter especially in southern examples (female), fully half (male) or generally about a fourth (female) longer than the heavily and densely punctate metazona. Prosternal spine not very long, appressed cylindrical, tapering apically, bluntly pointed, erect; interspace between mesosternal lobes fully twice as long as broad (male) or quadrate (female). Tegmina about as long as the pronotum, broad ovate, overlapping, and feebly subacuminate at tip (excepting in extreme southern examples, where it is well rounded); wings not half the length of the tegmina. Fore and middle femora slightly tumid in the male; hind femora ferrugineo-testaceous, occasionally with an olivaceous tinge, feebly bimaculate with fuscous above, the spots often extending halfway across the inner face, the lower face castaneous, occasionally ruddy, the whole geniculation fuscous and the genicular arc black; hind tibiae bright red, sometimes feebly infuscated or dulled toward the base, and with a fuscous patellar

spot, the spines black in the apical half, crowded, eleven to sixteen, usually twelve to thirteen, in number in the outer series. Extremity of male abdomen a little clavate, a little recurved, the supraanal plate triangular, acutangulate at tip, with strongly elevated and sharp submedian ridges on either side of the deep, narrow, and subequal median sulcus, which fades and widens apically; furcula consisting of the slightly tumid attingent portions of the mesially divided last dorsal segment, each produced posteriorly as a triangular tooth projecting over the supraanal plate, the tooth sometimes shorter than, usually as long as, the basal swelling, in southern examples half as long again as it (the length slightly exaggerated in fig. 6); cerci simple, feebly falciform blades about twice as long as their basal breadth, at the rounded apex about half as broad as at base, usually slightly incurved, and generally exteriorly sulcate on the apical half, sometimes to a considerable degree; subgenital plate small, conical, the upper margin acutangulate as seen from above, in one plane, entire.

Length of body, male, 17 mm., female, 22 mm.; antennae, male and female, 8 mm.; tegmina, male, 5 mm., female, 5.25 mm.; hind femora, male, 10 mm., female, 12.75 mm.

Seventy-three males, 95 females. Brunswick, Maine, Packard (Museum Comparative Zoology); Springfield, Hampden County, Massachusetts, Allen (same); Deep River, Middlesex County, Connecticut, August 24 (A. P. Morse); New Haven, Connecticut, S. I. Smith, A. P. Morse (S. H. Scudder; Museum Comparative Zoology); North Haven, New Haven County, Connecticut, August 23 (A. P. Morse); South Kent, Litchfield County, Connecticut, August 19-20 (A. P. Morse); Staten Island, New York, September 18, W. T. Davis; Maryland, September 15, 19, October 18, 25, P. R. Uhler; Middle States, R. Osten Sacken; Washington, D. C. (L. Bruner, U.S.N.M.); Virginia (U.S.N.M.—Riley collection); Shenandoah Valley, Virginia, October, Packard (Museum Comparative Zoology); Vigo County, Indiana, W. S. Blatchley (S. H. Scudder; A. P. Morse); Bloomington, Monroe County, Indiana, Bollman (U.S.N.M.); Lexington, Fayette County, Kentucky, August 29, September 3, H. Garman; near Mammoth Cave, Kentucky, October, Putnam (Museum Comparative Zoology); Illinois, Uhler (S. H. Scudder; L. Bruner); Northern Illinois, Kennicott; Ogle County, Illinois, J. A. Allen; Chicago, Cook County, Illinois, September (U.S.N.M.—Riley collection); Rock Island, Illinois, Walsh; Moline, Rock Island County, Illinois, McNeill; Southern Illinois, November 1 (U.S.N.M.—Riley collection); Saint Clair County, Illinois, October 29 (same); Jackson County, Illinois (same); Dallas County, Iowa, August 8-10, September 1-3, J. A. Allen; Jefferson, Greene County, Iowa, July 20-24, Allen; Crawford County, Iowa, July 13-24, Allen; West Point, Cuming County, Nebraska, L. Bruner; Missouri, September 24-25 (U.S.N.M.—Riley collection); Savannah, Andrew County, Missouri, October 30 (same); Central Missouri (same); Boone County, Missouri, November 1 (same); Saint

Louis, Missouri, October 10 (same); Kirkwood, Saint Louis County, Missouri, September 6, October (same); Bushberg, Jefferson County, Missouri, August 24 (same); Mississippi (L. Bruner); Texas, September 20, October 13, Belfrage; Dallas, Texas, Boll (S. H. Scudder; U.S.N.M.—Riley collection); Fort Worth, Tarrant County, Texas (U.S.N.M.—Riley collection).

It has also been reported from New Jersey (Smith), Ithaca, New York (Comstock), Normal, McLean County, Illinois (Thomas), various parts of Kentucky (Garman), Topeka, Shawnee County, Kansas (Bruner), and, with doubt, by Thomas from Colorado "subalpine" and southern Colorado.

The species varies to a considerable degree, as appears in part from the above description. Texan specimens have the tegmina uniformly less acuminate apically and a longer furcula. Occasionally the tegmina are considerably longer than the pronotum, as appears especially in a pair sent me by Professor H. Garman from Kentucky. Specimens from southern New England appear uniformly somewhat smaller than others, while there is no difference in size between specimens from Maryland and Texas.

Walsh, supposing the species here described as *M. walshii* to be the true *M. scudderi*, named the present species in his letters *Pezotettix rubricrus*, and I still possess several specimens sent me by him in 1865 under that name. Examination of the types of Uhler and Thomas show that *scudderi* and *unicolor* are identical, as McNeill thought.

Riley states that this species attains maturity in the vicinity of Saint Louis, Missouri, about September 1, and begins to oviposit on September 24. The eggs have a quadrilinear arrangement in the pod. Uhler found it abundant near Baltimore, Maryland, on "the sides of high hills," Beutenmüller about New York City in "dry places," and Comstock about Ithaca, New York, "among scattered trees on the crests and slopes of our highest hills." In the West, however, Allen found it in Iowa "common in grassy groves" and "on prairies," while McNeill says that in Illinois it "is very frequently found along roadsides or in pastures," and in Indiana Blatchley finds it "in open woods and pastures."

42. MELANOPLUS GILLETTEI, new species.

(Plate XIV, fig. 7.)

Of rather small size, blackish fuscous, testaceous beneath. Head not prominent, brownish fuscous deepening in tint above and flecked with testaceous below, the clypeus and labrum testaceous, flecked with fuscous; vertex rather feebly tumid, not elevated above the pronotum, the interspace between the eyes twice as broad as the first antennal joint; fastigium steeply declivent, rather feebly sulcate; frontal costa fading well before the clypeus, feebly narrowed above, as broad as the interspace between the eyes, faintly sulcate at and below the ocellus, biserially punctate; eyes moderately large, not very prominent, some-

what longer than the infraocular portion of the genae; antennae dark castaneous, about four-fifths as long as the hind femora. Pronotum narrowest at the hinder section of the prozona, feebly expanding in front, slightly more on the metazona, the piceous postocular band of the lateral lobes confined to the prozona and inconspicuous from the dark color of the insect, though brought slightly into prominence by the slight paling of the lower portion of the lateral lobes and the rufous tinge of the sides of the disk, the disk very broadly convex and passing by rounded shoulders simulating lateral carinae into the vertical lateral lobes, where each half of the prozona is slightly and independently tumid; median carina distinct and rather prominent on the metazona, blunt on the prozona, particularly between the sulci; front margin feebly convex, hind margin rotundato obtusangulate; prozona longitudinally subquadrate, slightly longer than the somewhat coarsely punctate metazona. Prosternal spine short and stout, appressed conical, retrorse; interspace between mesosternal lobes about half as long again as broad. Tegmina abbreviate, rather broad ovate, subfusiform, apically acuminate, about as long as the pronotum, attingent, blackish fuscous. Fore and middle femora considerably tumid in the male; hind femora rather long and slender, blackish fuscous, the outer face more or less and irregularly blotched with dull testaceous, the inferior face dull rufous, the whole geniculation and lower genicular lobe blackish; hind tibiae very pale dull greenish, minutely flecked with fuscous, the spines black almost to the base, ten to eleven in the outer series. Extremity of male abdomen feebly clavate, strongly recurved, the supraanal plate long triangular, subhastate, the apex subrectangulate, the lateral margins narrowly elevated, the median sulcus with its low rounded walls shallow, broad at extremities and narrowed near the middle, where the plate is traversed by a slight transverse ridge which does not reach the margins; furcula consisting of a pair of widely divergent, slender, tapering, acuminate spines crossing nearly the basal fourth of the supraanal plate; cerci broad, flat, subvertical laminae, slightly more compressed at apex than at base, lying nearly in one plane but feebly incurved and very faintly upcurved, subequal, well rounded apically particularly on the inferior margin, a little more than twice as long as broad, falling considerably short of the tip of the supraanal plate, rather coarsely punctate; subgenital plate small, feebly subpyramidal, the apex elevated only by the gradual and exceedingly slight upward curve of the margin, which as seen from above is well rounded and entire.

Length of body, male, 16 mm.; antennae, 6 mm.; tegmina, 4 mm.; hind femora, 9.75 mm.

Two males. Rabbit Ears Pass, Colorado, at the height of about 10,000 feet, or probably 1,000 feet below timber line, July 30, C. F. Baker (C. P. Gillette). Mr. Baker has also sent me specimens taken by him at Cameron Pass in northern Colorado at a height of 11,800 feet, and on Clark's Peak, Colorado, at a height of 11,700 feet.

43. MELANOPLUS ARTEMISIAE, new species.

(Plate XIV, fig. 8.)

Pezotettix artemisiae BRUNER!, MS.*Pezotettix parabilis* McNEILL!, MS.

Of rather small size, cinereo-fuscous. Head rather prominent, dull testaceous, heavily blotched with fuscous if not wholly infuscated, deepest on the elevated portions, above cinereo-testaceous, heavily flecked with fuscous in stripes radiating from the fastigium and in a postocular band; vertex somewhat tumid, distinctly elevated above the level of the pronotum, the interspace between the eyes fully half as wide again (male) or fully twice as wide (female) as the first antennal joint; fastigium rather steeply declivent, sulcate; frontal costa percurrent, equal or faintly enlarging below, nearly as wide as the interspace between the eyes, very feebly sulcate at and a little below the ocellus, punctate above; eyes not very large but prominent, especially in the male, distinctly larger than the infraocular portion of the genae; antennae testaceous, five-sixths (male) or scarcely three-fifths (female) as long as the hind femora. Pronotum rather short, subequal, feebly enlarging posteriorly, the lateral lobes with a feeble fuscous postocular band on the prozona, the disk frequently punctate with fuscous, very broadly convex and passing by a rounded shoulder, feebly angulated on the metazona, into the anteriorly feebly tumid subvertical lateral lobes; median carina percurrent, but blunt on the prozona, especially between the sulci where it is often subobsolete; front margin truncate, hind margin rotundato-obtusangulate, slightly more angulate in the male than in the female; prozona transversely subquadrate (male) or distinctly transverse (female), about a fifth longer than the densely punctate metazona. Prosternal spine rather short, erect, conico-pyramidal, subappressed; interspace between mesosternal lobes truncato-cuneiform, a little longer than broad (male) or distinctly transverse, not much narrower than the lobes (female). Tegmina broad-ovate, broader in the female than in the male, scarcely shorter than the pronotum, attingent, the apex angulate. Fore and middle femora very feebly enlarged in the male; hind femora long and slender, sordid flavo-testaceous, twice rather narrowly demi-cingulate with fuscous above and touched with fuscous at the base, the genicular are fuscous; hind tibiae very pale and very dull glaucous, with a fuscous patellar spot, the spines black on the apical half, ten to eleven, rarely nine, in number in the outer series. Extremity of male abdomen barely clavate, scarcely recurved, the supraanal plate triangular with straight or nearly straight sides, acutangulate apex, the surface nearly plane, rising mesially and basally into a pair of high, sharp, feebly convergent ridges, inclosing a very deep and tapering median sulcus which covers two-thirds of the plate; furcula consisting of a pair of distant minute denticulations overlying the submedian ridges of the

supraanal plate; cerci moderately stout, nearly equal in width throughout, the basal half exteriorly tumid, the apical half roundly bent inward and exteriorly broadly sulcate, the apex well rounded and nearly reaching the tip of the supraanal plate; subgenital plate small, feebly subpyramidal, the margin as seen from above acutely bent apically and feebly tuberculate by its slight apical elevation.

Length of body, male, 16 mm., female, 21 mm.; antennae, male, 7.5 mm., female, 5.75 mm.; tegmina, male and female, 3.5 mm.; hind femora, male, 9 mm., female, 10 mm.

Four males, 10 females. Salmon City, Lemhi County, Idaho, August (U.S.N.M.—Riley collection; L. Bruner; S. H. Scudder).

44. MELANOPLUS MANCUS.

(Plate XIV, fig. 9.)

Pezotettix manca SMITH!, Proc. Portl. Soc. Nat. Hist., I (1868), p. 149.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 149.—SCUDDER!, Hitchc., Rep. Geol. N. H., I (1874), p. 374.—GIRARD, Traité d'Ent., II (1879), p. 246.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.—FERNALD, Orth. N. E. (1888), pp. 29, 30; Ann. Rep. Mass. Agric. Coll., XXV (1888), pp. 113, 114.—MCNEILL, Psyche, VI (1891), p. 77.—MORSE, *ibid.*, VII (1894), p. 106.

Podisma manca WALKER, Cat. Derm. Salt. Brit. Mus., V (1871), p. 72.

Of rather small size, blackish fuscous above, the abdomen and legs more or less ferruginous, below light castaneous. Head not prominent, the face and genae testaceous, feebly olivaceous, and sometimes faintly clouded with fuscous, the summit blackish fuscous with a distinct and broad piceous postocular band; vertex gently convex, scarcely elevated above the pronotum, the interspace between the eyes half as broad again (male) or twice as broad (female) as the first antennal joint; fastigium rather steeply declivent, rather (male) or very (female) shallowly sulcate; frontal costa subequal, a little contracted narrowly at summit, especially in the male, slightly narrower than the interspace between the eyes, fading just before the clypeus, feebly sulcate at and below the ocellus, punctate throughout; eyes of moderate size, rather prominent, particularly in the male, distinctly longer than the infraocular portion of the genae; antennae dark castaneous, apically infuscated, less than three fourths (male) or about two-thirds (female) as long as the hind femora. Pronotum rather short, feebly enlarging posteriorly but more rapidly on the metazona, the upper portion of the lateral lobes occupied by a broad piceous postocular band, broadening posteriorly and generally weaker on, but never absent from, the metazona; disk broadly convex, passing by a broadly rounded shoulder nowhere forming semblance of lateral carinae into the inferiorly vertical lateral lobes; median carina distinct on the metazona, blunt, equal, and almost subobsolete on the prozona; front margin truncate or subtruncate, hind margin very broadly convex, occasionally subangulate, the angle exceedingly obtuse; prozona slightly longitudinal (male) or quadrate (female), about a fourth (male) or a fifth (female) as long

again as the densely and finely punctate metazona. Prosternal spine rather short, slightly appressed conical, blunt, erect, rather shorter and stouter in the female than in the male; interspace between mesosternal lobes nearly half as long again as broad (male) or transverse, but much narrower than the lobes (female). Tegmina broad rounded-ovate, shorter than the pronotum, attingent or subattingent, feebly subangulate at apex, dark brownish fuscous. Fore and middle femora a little tumid in the male; hind femora ferrugineo-testaceous, sometimes with an olivaceous tinge, often more or less infuscated on the outer face, especially next the carinae, the geniculation infuscated, sometimes almost black; hind tibiae rather deep red, often paler next the base, with a feeble and narrow fuscous patellar annulus, the spines black almost or quite to their base, ten to eleven in number in the outer series. Extremity of male abdomen very feebly clavate, somewhat recurved, the supraanal plate long subclypeate, the lateral margins raised and slightly contracted mesially, the apex roundly subrectangulate, the median sulcus rather narrow, equal, percurrent, the bounding ridges not very high, but moderately sharp; furcula consisting of a pair of approximate, parallel, slight, cylindrical, tapering spines, projecting over the submedian ridges of the supraanal plate by no more than the length of the last dorsal segment; cerci rather long and slender, the lower margin nearly straight, tapering in the proximal half to about half its basal breadth, thereafter subequal, a little incurved and faintly twisted, scarcely reaching the tip of the supraanal plate, well rounded at tip; subgenital plate pyramidal, a little elongate and at tip subtuberculate, the margins in one plane, as seen from above with a parabolic curve, entire.

Length of body, male, 15.5 mm., female, 22 mm.; antennae, male, 6.25 mm., female, 7.25 mm.; tegmina, male, 3.25 mm., female, 4.25 mm.; hind femora, male, 8.75 mm., female, 11 mm.

Eighty-six males, 103 females. Speckled Mountain, Stouham, Oxford County, Maine, August 15, S. I. Smith; the same, August 18, A. P. Morse (A. P. Morse; Museum Comparative Zoology; S. H. Sender); Mount Sargent, Mount Desert Island, Maine, August; Kearsarge Mountain, North Conway, Carroll County, New Hampshire, 2,000 to 3,251 feet, September 4 (A. P. Morse). It has also been reported by McNeill from Running Lake, Illinois.

45. MELANOPLUS CANCRI, new species.

(Plate XIV, fig. 10.)

Of small size, testaceous. Head not prominent, uniformly testaceous, except in being darker above along the middle line in the male, and with a narrow postocular black stripe; vertex gently tumid, scarcely elevated above the pronotum, the interspace between the eyes hardly as wide as (male) or scarcely half as wide again as (female) the first antennal joint; fastigium steeply declivent, narrowly sulcate, at least

in the male, broadening a little anteriorly; frontal costa faintly wider than the interspace between the eyes, equal, fading just before the clypeus, feebly sulcate at and below the ocellus, punctate above; eyes rather large and rather prominent, particularly in the male, half as long again as the infraocular portion of the genae; antennae (?). Pronotum feebly enlarging on the metazona, the lateral lobes with only broken signs of a postocular dark band on the prozona, the disk very broadly convex, passing by a distinct rounded angle, forming a feeble lateral carina, into the rounded subvertical lateral lobes; median carina distinct but slight on the metazona, subobsolete or obsolete on the prozona; front margin truncate, hind margin strongly obtusangulate; prozona feebly transverse, but little longer than the densely and not very finely punctate metazona. Prosternal spine moderately long, rather slender, at least in the male, conical, erect; interspace between mesosternal lobes nearly twice as long as broad (male) or quadrate (female). Tegmina as long as or slightly longer than the pronotum, ovate, moderately broad, attingent or overlapping, apically acuminate. Fore and middle femora a little tumid in the male; hind femora not very long, somewhat compressed, uniform light testaceous, with fuscous genicular arc; hind tibiae light testaceous, the apical half of the spines black, nine to ten in number in the outer series. Extremity of male abdomen hardly clavate, a little recurved, the supraanal plate triangular, with acutangulate apex, the surface nearly plane, except that it sweeps up to the sharp, elevated, and apically united submedian ridges inclosing a very narrow and deep median sulcus, which crosses two-thirds of the plate; furcula consisting of a pair of approximate, small, triangular denticulations, no longer than the last dorsal segment, overlying the ridges of the supraanal plate; cerci small, subfalciiform, tapering to two-thirds the basal width on proximal half, beyond equal, bent a little inward and curved upward, exteriorly sulcate, apically rounded, much shorter than the supraanal plate; subgenital plate small, feebly subconical, projecting slightly, the apical margin rising very feebly to an obscure apical tubercle, and as seen from above with a parabolic curve, entire.

Length of body, male, 14 mm., female, 20 mm.; tegmina, male, 3.5 mm., female, 5.5 mm.; hind femora, female, 12 mm.

One male, 1 female. Cape St. Lucas, Lower California, J. Xantus. The single pair are somewhat broken and have been bleached in alcohol, so that the colors of the above description will have to be revised with fresh material.

12. DAWSONI SERIES.

This group is composed of rather heterogeneous material if the macropterous forms alone are considered, and is even more loosely compacted when the brachypterous species are mingled with them. In size they range from rather small to medium. A single species is dimorphic, being both brachypterous and macropterous.

The prozona is quadrate or subquadrate in the male, but in some brachypterous forms longitudinal. The interspace between the mesosternal lobes in the same sex is always longer than broad and sometimes more than twice as long as broad. The tegmina are either fully developed or slightly abbreviate so as not to surpass the hind femora, or else they are shorter than the pronotum, and then apically rounded or very bluntly subacuminate, generally slightly maculate. The hind tibiae vary in color, and have from nine to thirteen spines in the outer series.

The supraanal plate of the male is generally as in the femur-rubrum series, but the apical third or more is frequently depressed. The furcula is very variable, being either as in the devastator series, but generally rather shorter, or reduced to distant slight dentations or to rounded partially projecting lobes. The cerci are generally symmetrically rounded at tip and otherwise as in the femur-rubrum series, or with very slight difference in breadth basally and apically, usually rather short, and in one instance bent abruptly inward at less than a right angle. The subgenital plate is usually broad throughout, the apical margin well rounded and slightly elevated but not emarginate, but sometimes it is rather narrow throughout and not apically elevated.

The species of this group, seven in number, are divided unequally between macropterous and brachypterous forms, one species being dimorphic, four others brachypterous, and two macropterous. They occur almost wholly in the great interior region between the Mississippi River and the Rocky Mountains, and extend from Alberta and Assiniboia to central Mexico. No species are known from the Pacific Coast and only one east of the Mississippi, in Georgia and North Carolina.

46. MELANOPLUS REFLEXUS, new species.

(Plate XV, fig. 1.)

Dull ferruginous brown, lutescent below and on abdomen. Head luteo-testaceous, more or less marmorate with light fuscous, fusco-ferruginous above, with a broad postocular piceous patch; vertex very gently tumid, not elevated above the pronotum, the interspace between the eyes rather broad, much broader than, in the female twice as broad as, the first antennal joint; fastigium rather rapidly declivent, very feebly and broadly sulcate in the male, nearly plane in the female; frontal costa broad, failing to reach the clypeus, slightly contracted above, at least in the male, almost (female) or fully (male) as broad as the interspace between the eyes, feebly and narrowly sulcate at and below the ocellus, punctate throughout but nowhere seriatly; eyes moderately large, not prominent, a little longer than the infraocular portion of the genae; antennae ferruginous, in the female less than two-thirds as long as the hind femora. Pronotum short, subequal, very faintly and uniformly enlarging posteriorly, rather full than contracted in the middle, very

feebly tectate above, passing by a well-rounded angle into the inferiorly vertical lateral lobes, ferruginous brown above, fading out on the metazona into ferruginous, luteo-testaceous below; front margin subtruncate, hind margin broadly convex; median carina percurrent, slight, the transverse sulci of the prozona slight and not cutting the median carina; prozona longitudinal, very sparsely and feebly punctate, about a third longer than the finely and densely punctate metazona. Prosternal spine short, appressed cylindrical, blunt, strongly retrorse; interspace between mesosternal lobes more than twice as long as broad (male) or subquadrate (female), the metasternal lobes subattinent (male) or subapproximate (female). Tegmina broad oval, shorter than the pronotum, very broadly rounded apically, overlapping, wood-brown, with a basal blackish fuscous cloud in the costal area. Femora luteo-ferruginous, the fore pair feebly tumid in the male, the hind pair dull ferruginous on the upper face, feebly and irregularly blotched or freckled with light fuscous on the outer and inner faces, flavous or vinous beneath, the genicular arc and most of the geniculation black; hind tibiae glaucous-green, the spines black with pallid bases, ten in number in the outer series. Thoracic pleura piceous, with the front face of the mesothoracic episterna and the ridge of the metathoracic epimera luteo-testaceous. Abdomen testaceous, with the sides, especially of basal segments, piceous or blackish fuliginous; extremity in the male clavate, well upturned, the supraanal plate broad triangular, the apex rectangulate but compressed so that the sides are sinuate, the lateral halves very broadly and very shallowly sulcate, the median sulcus broad at base, narrowing as far as the middle and thereafter narrow and percurrent; its lateral walls sharp and high only in the basal portion; furcula consisting of a pair of lobate distant expansions of the middle of the last dorsal segment, resting upon the outer side of the base of the marginal ridges of the median sulcus of the supraanal plate; cerci moderately broad, straight, slightly tapering, flat on the external face, which is a little more than twice as long as the median breadth, then abruptly recurved inward, leaving a ragged, concave terminal edge, the reversed flange a little longer than broad, apically rounded, deeply excavated, pressing against the compressed portion of the supraanal plate; subgenital plate small, considerably longer than broad, not prolonged, of equal width throughout, except for a feeble apical elevation, forming a small blunt tubercle.

Length of body, male, 16.75 mm., female, 21.5 mm.; antennae, female, 7.25 mm.; tegmina, male, 4 mm., female, 4.75 mm.; hind femora, male, 10.25 mm., female, 12.5 mm.

One male, one female. Ciudad del Maiz, San Luis Potosi, Mexico, E. Palmer.

The character of the cerci with their reversed apex distinguishes this species at a glance from all other *Melanopli*.

47. MELANOPLUS MERIDIONALIS, new species.

(Plate XV, fig. 2.)

Fusco-ferruginous, more or less lutescent beneath. Head not prominent, fusco-ferruginous above, elsewhere dark olivaceous, except a piceous postocular band, the vertex gently tumid, slightly elevated above the pronotum, the interspace between the eyes rather broad, much broader than, in the female fully half as broad again as, the first antennal joint; fastigium rapidly declivent, abruptly broadened in front, very shallowly sulcate throughout; frontal costa broad, subequal, slightly contracted above in the male, failing to reach the clypeus, rather broader than the interspace between the eyes, feebly sulcate at and below the ocellus, densely punctate; eyes of moderate size, moderately prominent in the male, longer than the infraocular portion of the genae; antennae ferruginous, slightly infuscated apically, about three-fourths (male) or nearly two-thirds (female) as long as the hind femora. Pronotum fusco-ferruginous above, luteous or olivaceo-luteous on the lower half of the lateral lobes, the upper half on the prozona brownish fuscous, deepening below into piceous, or wholly dull piceous; subequal, scarcely expanding on the metazona, the disk broadly convex, passing almost insensibly, but with a very bluntly rounded angle, into the vertical lateral lobes, the median carina slight, percurrent, and similar throughout; transverse sulci feeble, not cutting the median carina; prozona very sparsely and feebly punctate, longitudinal (male) or longitudinally subquadrate (female), one-third (male) or one fourth (female) longer than the obscurely and finely punctate metazona. Prosternal spine moderately long (male) or rather short (female), conico-cylindrical, appressed, blunt; interspace between mesosternal lobes nearly twice as long as broad (male) or slightly transverse (female). Tegmina broad oval, shorter than the pronotum, apically broadly rounded and slightly emarginate, brownish fuscous. Hind femora fusco-ferruginous, the upper carinae often fuscous, the inferior basal half of the outer face often gradually lutescent, the inferior face and base of inner face fulvous or roseate, the geniculation, including most or all of the lower genicular lobe, blackish; hind tibiae glaucous, often more or less diffusely infuscated basally, sometimes lutescent apically, clothed with rather long pile, the spines black with pallid base, ten to eleven in number in the outer series. Extremity of the male abdomen clavate, much upturned, the supraanal plate broad triangular, with nearly straight, narrowly and slightly raised lateral margins, slightly depressed faintly acutangulate tip, and a short, triangular, rather deeply impressed, basal, median sulcus; furecula consisting of a pair of rather large, thickened, brief, lobate expansions of the last dorsal segment, overlying the bases of the apically convergent ridges, which bound the median sulcus of the supraanal plate; cerci

very simple, being slightly incurved, but otherwise straight and subequal laminae, a little more than three times as long as broad, tapering feebly for a short distance from the base and apically expanding in the slightest degree, the apical margin broadly rounded; subgenital plate a little longer than broad, a little prolonged and slightly elevated apically, the apical margin angulate, but rounded and entire.

Length of body, male, 17 mm., female, 22 mm.; antennae, male, 7 mm., female, 7.5 mm.; tegmina, male, 3.5 mm., female, 4 mm.; hind femora, male, 10 mm., female, 12 mm.

Three males; 8 females. Mount Alvarez, San Luis Potosi, Mexico, E. Palmer.

48. *MELANOPLUS MILITARIS*, new species.

(Plate XV, fig. 3.)

Blackish fuscous above with some ferruginous tints, pallid below. Head not prominent or feebly so in the male, blackish fuscous above, sometimes heavily irrorate with testaceous, the rest, except a rather narrow postocular piceous band, very pallid plumbeous, sometimes with a pinkish hue, the genae more or less flecked with fuscous posteriorly: vertex gently tumid, distinctly elevated above the pronotum, the interspace between the eyes rather broad, nearly or quite twice as broad as the first antennal joint, similar in the two sexes; fastigium rapidly declivent, shallowly sulcate; frontal costa only moderately broad, as broad as (female) or slightly narrower than (male) the interspace between the eyes, subequal, just failing to reach the clypeus, slightly sulcate at and below the ocellus, rather feebly punctate; eyes not very large, rather prominent in the male, rather shorter than the infraocular portion of the genae; antennae fusco-luteous or fusco-ferruginous, more than three-fourths (male) or less than three-fifths (female) as long as the hind femora. Pronotum dull testaceous, very heavily sprinkled with blackish fuscous above, especially on the prozona, sometimes so as to become almost wholly blackish fuscous, the metazona ferruginous, the upper half of the lateral lobes with a sometimes broken, broad, piceous band, which fades partially or completely on the metazona, the whole pronotum short, equal on the prozona, enlarging gradually and slightly on the metazona, the disk very broadly convex and passing almost insensibly but with a very broadly rounded angle into the vertical (male) or subvertical (female) lateral lobes; front margin truncate, hind margin broadly convex with a feeble angulation in the male; median carina feeble on the metazona, subobsolete on the prozona; transverse sulci of the prozona tolerably distinct, percurrent; prozona quadrate, about a fourth longer than the obscurely punctate metazona. Prosternal spine short, stout, very blunt, conical, erect, in the female a little appressed; interspace between mesosternal lobes nearly twice as long as broad (male) or strongly transverse, nearly as broad as the lobes

(female). Tegmina short, sublanceolate, lateral, shorter than the pronotum, the tip rounded, subangulate, brownish fuscous, blackish at the base of the discoidal area. Hind femora pallid testaceous, very transversely and narrowly bifasciate with blackish fuscous, the inferior face and lower half of interior face roseate and unbroken, the geniculation black; hind tibiae red, the spines black almost or quite to the base, nine to ten in number in the outer series. Abdomen sordid pale testaceous, heavily overlaid or blotched with blackish fuscous, the extremity in the male feebly clavate, a little upturned, the supraanal plate triangular, with convex sides, rectangular apex, the mesial region broadly elevated in more than the basal half and with a median closed sulcus of considerable depth, the sides of the plate also basally elevated, so that two lateral valleys are formed with synclinal sides; furcula consisting of a pair of slender, a little divergent, tapering, acuminate spines, crossing the basal third of the supraanal plate; cerci rather small, rapidly tapering in the basal half by the excision of the upper margin (much more rapidly than shown in the figure), beyond subequal and arcuate, being a little upturned, narrowed and well rounded apically, not at all incurved, as long as the supraanal plate; subgenital plate small, much longer than broad, not at all produced apically and elevated only at extreme tip and slightly, the apical margin well rounded, entire.

Length of body, male, 17.5 mm., female, 22 mm.; antennae, male, 7.5 mm., female, 6.5 mm.; tegmina, male and female, 3.25 mm.; hind femora, male, 9.1 mm., female, 11.75 mm.

One male, 1 female. Soldier, Logan County, Idaho (L. Bruner).

49. MELANOPLUS NIGRESCENS.

(Plate XV, fig. 4.)

? *Pezotettix zimmermanni* SAUSSURE, Rev. Mag. Zool., 1861 (1861), p. 159; Orth. Nov. Amer., II (1861), p. 9.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 150.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.

? *Podisma zimmermanni* WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 718.

Caloptenus nigrescens SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1877), p. 27;

Ent. Notes, VI (1878), p. 5; Cent. Orth. (1879), p. 44.

Pezotettix nigrescens SCUDDER!, Can. Ent., XII (1880), p. 75.

Melanoplus nigrescens SCUDDER, Cent. Orth. (1879), p. 84.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 61.

Dull wood-brown, the sides and tegmina marked with black. Antennae reddish brown, a little infuscated at the tip; front of head more or less infuscated, the upper border of the eye margined by a pale yellowish stripe, followed inferiorly behind the eye by a more or less distinct, broad, blackish belt, which extends upon the pronotum, where it infuscates the upper third of the lateral lobes, especially anteriorly, and deepens to black next the lateral carinae; metathoracic epimera yellowish or pale yellowish brown, edged on either side with black. Anal

field of tegmina testaceous, the remainder black, the extreme tip testaceous. Fore and middle legs dull fusco-testaceous; hind femora yellow, more or less tinged with brownish, with a broad black band on either side of the middle, whose edges follow the impressed lines, the basal one sending a median shoot to the base; hind tibiae vinous red, a little infuscated at the base, the spines black, ten to twelve in number in the outer series.

Vertex gently tumid, a little elevated above the pronotum, the interspace between the eyes broader than (female) or scarcely as broad as (male) the basal joint of the antennae; fastigium rapidly declivent, broadly and shallowly sulcate; frontal costa broad, subequal, sulcate throughout excepting just above the antennae; eyes pretty large, a little prominent in the male, shorter than the infraocular portion of the genae; antennae about as long as (male) or two-thirds as long as (female) the hind femora. Pronotum with equal sides, the transverse sulci moderate, continuous, nearly straight, the median carina distinct on the metazona, the disk separated from the lateral lobes by a distinct but bluntly rounded angle; front margin subtruncate, faintly emarginate in the female, hind margin very obtusely angulate; prozona longitudinal (male) or subquadrate (female), about a fourth longer than the ruguloso-punctate metazona. Prosternal spine rather long, cylindrical, apically tapering but blunt, retrorse, in the female appressed and stouter; interspace between mesosternal lobes half as long again as broad (male) or quadrate (female). Tegmina only half as long as the abdomen, longer than the pronotum, tapering, the inner margin convex, apically subacuminate; wings slightly shorter. Hind femora stout and long. Extremity of male abdomen clavate, a little upturned, the supra-anal plate triangular, with convex sides, acutangulate apex, and a percurrent, not very deep, median sulcus; furcula consisting of a pair of slight approximate spines overlying the ridges bordering the sulcus of the supraanal plate; cerci moderate in size, compressed, tapering and straight on the middle half, with an obscure inner superior basal tubercle, beyond the middle bent inward and a little upward, equal, the tip squarely truncate with rounded angles; subgenital plate small, longer than broad, slightly elevated and feebly prolonged at apex, forming a slight tubercle.

Length of body, male, 23 mm., female, 26.5 mm.; antennae, male, 13 mm., female, 11 mm.; tegmina, male, 9 mm., female, 9.5 mm.; hind femora, male, 13.5 mm., female, 16.5 mm.

One male, three females. Georgia, Morrison; Smithville, North Carolina, November 22.

It seems very probable that this species is the *Pezotettix zimmermanni* of Saussure, described from the female only, but I find it impossible to determine from the description. If it should so prove, of course the name has priority over the one here employed.

50. MELANOPLUS DAWSONI.

(Plates I, fig. a; XV, fig. 5.)

Pezotettix dawsoni SCUDDER!, Daws. Rep. Geol. Rec. 49th Par. (1875), p. 343; Butt. Orth. N. A. Bonnd. Comm. (1875), p. 3; Can. Ent., XII (1880), p. 75.—CAULFIELD, Rep. Ent. Soc. Ont., XVIII (1886), p. 71; Can. Rec. Sc., II (1887), p. 401; Can. Orth. (1887), p. 13.

Pezotettix tellustris SCUDDER!, Ann. Rep. Chief Eng., 1876 (1876), p. 502; Ann. Rep. Geogr. Surv. 100th Mer., 1876 (1876), p. 282; Can. Ent., XII (1880), p. 75.—BRUNER, Rep. U. S. Ent. Comm., III, (1883), p. 59.

Pezotettix abditum DODGE!, Can. Ent., IX (1877), p. 113.—SCUDDER!, Can. Ent., XII (1880), p. 75.—BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 27.

Melanoplus abditum OSBORN, Proc. Iowa Acad. Sc., I, Pt. II (1892), p. 118.

Obscure fusco testaceous. Head slightly prominent in the male only, olivaceo-testaceous, infuscated above, with a broad piceous, post-ocular band; vertex tumid, distinctly elevated above the pronotum, the interspace between the eyes rather broad, at least twice as broad as the first antennal joint; fastigium steeply declivent, plane, the lateral margins feebly and broadly elevated; frontal costa broad, subequal, as broad as the interspace between the eyes, fading out before reaching the clypeus, above plane (male) or feebly convex (female), at and below the ocellus slightly sulcate, everywhere punctate, with a tendency above to a biseriate arrangement; eyes not very large, not prominent, scarcely longer than the infraocular portion of the genae; antennae ferruginous, four-fifths (male) or three fifths (female) as long as the hind femora. Pronotum subequal (male) or distinctly compressed above anteriorly (female), short, the disk transversely a little convex and passing into the vertical lateral lobes by a rounded angle, which is nevertheless so abrupt as to form, at least in the male, tolerably distinct lateral carinae; lateral lobes lighter colored below than the disk, above on the prozona a broad, lustrous, dark colored band, sometimes obsolete, sometimes deepening to piceous; median carina slight, percurrent, equal, but blunter on the prozona than on the metazona; front margin feebly convex, with a slight mesial emargination not always distinct, hind margin obtusangulate equally in macropterous and brachypterous forms; prozona distinctly longitudinal (male) or quadrate or subquadrate (female) a third to a fourth longer than the more closely punctate metazona. Prosternal spine very short and blunt, rather stout, somewhat transverse; interspace between mesosternal lobes half as long again as broad (male) or a little transverse (female). Tegmina brownish fuscous, more or less feebly flecked with fuscous and either greatly surpassing the hind femora, moderately broad and subequal nearly to the well rounded tip (*M. d. completus*, Plate I, fig. a), or ovate-lanceolate, apically subacuminate, a little longer than the pronotum only (*M. d. tellustris*); wings when fully developed ample, hyaline, with pale brownish fuscous veins, paler and sometimes wholly pallid in the anal area. Fore femora of male very feebly enlarged;

hind femora luteo- or ferrugineo-testaceous, very obliquely and broadly bifasciate with blackish fuscous above and outside, with a basal patch of the same, the whole sometimes reduced to mere clouds, the genicular arc and sometimes the whole geniculation blackish fuscous; hind tibiae wholly red, the spines black except at base, ten to thirteen in number in the outer series. Extremity of male abdomen a little clavate, upturned, the supraanal plate small, subclypeate, much longer than broad, the lateral margins elevated a little and broadly on the basal half, the apex subrectangulate, a little rounded, the median sulcus not deep, percurrent, with sharp but low bounding walls in the basal half; furcula consisting of a pair of subparallel, slender, tapering, acuminate, flattened fingers, seated on rather tumid bases (forming part of the last dorsal segment), lying outside the ridges of the supraanal plate, and extending about halfway across it; cerci small feebly falciform lamellae, tapering on the basal half only and well rounded at tip, gently incurved and almost as long as the supraanal plate; infra-cercal plates large, scarcely longer than the supraanal plate, almost completely concealed by the recumbent cerci; subgenital plate small, broad but longer than broad, subpyramidal, being apically compressed, the apical margin slightly elevated and subtubercular, entire.

Length of body (*M. d. tellustris*), male, 16 mm., female, 18.5 mm.; antennae, male, 7.5 mm., female, 6.25 mm.; tegmina, male and female, 5.25 mm.; hind femora, male, 9 mm., female, 10.5 mm. Length of body (*M. d. completus*), male, 14.5 mm., female, 17.5 mm.; antennae, male, 7 mm., female, 6 mm. (est.); tegmina, male, 15 mm., female, 16 mm.; hind femora, male, 8.75 mm., female, 10 mm.

Thirty-four males, 42 females. Fort McLeod, Alberta, Canada, August (L. Bruner; U.S.N.M.—Riley collection); Souris River, Assiniboia, G. M. Dawson; Montana (U.S.N.M.—Riley collection); Dakota (same; S. H. Scudder); Clifford, Traill County, North Dakota (L. Bruner); Custer, Black Hills, South Dakota, Bruner (U.S.N.M.—Riley collection); Wyoming, Morrison (same); St. Paul, Minnesota, August 27, Whitman (same); Red River, Manitoba, R. Kennicott; Dallas County, Iowa, August, J. A. Allen; Jefferson, Greene County, Iowa, July 20–24, Allen; Crawford County, and Denison, Crawford County, Iowa, July 10–24, Allen; Nebraska, Dodge (U.S.N.M.—Riley collection; S. Henshaw; S. H. Scudder); Lincoln, Lancaster County, Nebraska, September (L. Bruner); Fort Robinson, Dawes County, Nebraska, August 21, Bruner (U.S.N.M.—Riley collection); Colorado, Morrison (same; S. H. Scudder); Northern New Mexico, Lieutenant Carpenter Allen found the species in Iowa in grass on prairies.

There are two very distinct forms of this species, differing however only in the length of the organs of flight, the tegmina being abbreviated and subacuminate at tip in the form *M. d. tellustris* (retaining the second oldest name for the form incapable of flight), and fully developed, broad and ample, greatly surpassing the hind femora and well rounded

apically in that to which the name *M. d. completus* may be given. The latter appears to be rarer and has so far been found only in Dakota and at Red River, Manitoba. We owe its discovery to Professor Bruner.

51. MELANOPLUS GLADSTONI, new species.

(Plates I, fig. *b*; XV, fig. 6.)

Melanoplus gladstoni BRUNER!, MS.

Very dark testaceous, much infuscated, especially above. Head not prominent, luteo-castaneous, more or less clouded or blotched with fuscous, above wholly fuscous, with a narrow, posteriorly broadening, testaceous stripe, following the posterior upper edge of the eye and separating the vertex from a piceous or blackish fuscous postocular band; vertex gently tumid, very slightly elevated above the pronotum, the interspace between the eyes rather broad, nearly (male) or fully (female) twice as broad as the basal antennal joint; fastigium steeply declivent, broadly sulcate throughout; frontal costa rather prominent, as broad as the interspace between the eyes, equal, percurrent or almost percurrent, punctate especially laterally, feebly sulcate at and below the ocellus; eyes moderately large, not very prominent, anteriorly subtruncate, a little longer than the infraocular portion of the genae; antennae luteo-ferruginous, gradually and slightly infuscated apically, about three-fourths (male) or two thirds (female) as long as the hind femora. Pronotum subequal, feebly enlarging on the metazona, ferrugineo-testaceous, much infuscated on the disk, the lateral lobes with a broad, more or less distinct, dark, sometimes piceous band crossing the prozona above; disk nearly plane, passing by a tolerably distinct but rounded angle into the anteriorly slightly tumid vertical lateral lobes; median carina slight, percurrent, somewhat feebler and blunter on the prozona than on the metazona; front margin subtruncate, hind margin obtusangulate; prozona quadrate, sometimes feebly longitudinal in the male, scarcely if any longer than the closely but feebly punctate metazona. Prosternal spine rather stout, moderately long, appressed conical, blunt, feebly retrorse; interspace between mesosternal lobes fully half as long again as broad (male) or slightly transverse (female). Tegmina reaching and sometimes a little surpassing the tips of the hind femora, moderately slender, distinctly tapering, brownish fuscous, distinctly but not conspicuously maculate in the discoidal area; wings hyaline, with mostly brownish fuscous veins. Fore femora of male not greatly tumid; hind femora flavo-testaceous, twice broadly and very obliquely banded with blackish fuscous, with a basal patch of the same, all sometimes confluent on the outer face, which it then nearly fills, the lower face and lower half of inner face immaculate, the genicular arc black; hind tibiae faintly valgate, red with an inconspicuous fuscous patellar spot, the spines black except their pallid bases, ten to twelve, usually eleven, in number in the outer series. Extremity of male abdomen

clavate, upturned, the supraanal plate rather long triangular, with tolerably straight sides, slightly and broadly elevated in the basal half, acutangulate apex, the whole apical half at a slightly lower plane than the basal, the median sulcus rather broad and distinct, with rather sharp walls, terminating with the upper shelf; furcula consisting of a pair of slight, distant, slender denticulations, lying outside the ridges of the supraanal plate, much shorter than the last dorsal segment; cerci subequal, punctate, compressed laminae, about four times as long as broad, feebly and broadly constricted mesially, the apical portion scarcely so broad as the base, and gently incurved, somewhat sulcate, the tip well rounded but subangulate inferiorly, reaching the tip of the supraanal plate; subgenital plate small, a little broader at base than at apex, feebly compressed apically and faintly elevated, the apical margin well rounded, entire.

Length of body, male, 20 mm., female, 23 mm.; antennae, male and female, 9 mm.; tegmina, male and female, 16 mm.; hind femora, male, 12 mm., female, 13.25 mm.

Eighteen males, 9 females. Medicine Hat, Assiniboia, September, (U.S.N.M.—Riley collection; L. Bruner); Montana (L. Bruner); Gordon, Sheridan County, Nebraska (U.S.N.M.—Riley collection); Fort Robinson, Dawes County, Nebraska, August 21, L. Bruner (same); Custer County, Colorado, T. D. A. Cockerell (same).

Colorado and Nebraska specimens appear to have the male cerci slightly broader apically than those from farther north and may prove distinct.

52. *MELANOPLUS PALMERI*, new species.

(Plate XV, fig. 7.)

Grayish or brownish fuscous, darker above than below. Head not prominent, testaceous, sometimes ferrugineo-testaceous, more or less flecked with fuscous, which prevails above and appears in a broad post-ocular band; vertex gently tumid, slightly elevated above the pronotum, the interspace between the eyes rather broad, much broader than (male) or twice as broad as (female) the basal antennal joint; fastigium steeply declivent, sulcate throughout; frontal costa rather prominent, equal, as broad as the interspace between the eyes, percurrent, sulcate at and below the ocellus, feebly punctate; eyes rather large, moderately prominent in the male, distinctly longer than the infraocular portion of the teneae; antennae luteous or luteo-testaceous, about four-fifths (male) or two-thirds (female) as long as the hind femora. Pronotum subequal, enlarging a very little posteriorly, the lower half of the lateral lobes cleaner and brighter in color than the rest, the prozona with a more or less distinct but sometimes nearly obsolete postocular blackish fuscous band; disk passing by a well-rounded angle into the vertical lateral lobes, the median carina distinct on the metazona only, almost wholly obsolete on the prozona; front margin truncate, hind margin feebly

obtusangulate; prozona a little longitudinal (male) or quadrate (female), generally a little (male) or no (female) longer than the finely punctate metazona. Prosternal spine erect, conico-cylindrical, rather long, bluntly pointed, in the female slightly compressed; interspace between mesosternal lobes nearly twice (male) or a little (female) longer than broad. Tegmina surpassing considerably the hind femora, slender, tapering gently in apical half, brownish fuscous, almost the whole discoidal area maculate with fuscous with varying distinctness and delicacy; wings ample, hyaline, the anterior veins and cross-veins fuscous. Fore femora of male tolerably tumid; hind femora rather short and moderately stout and compressed, dull testaceous, rather broadly bifasciate, at least above, with blackish fuscous, the base and apex also infuscated, the under surface a little warmer in tint; hind tibiae very delicate pale green, the spines black from a little before their middle, nine to twelve in number in the outer series. Extremity of male abdomen clavate, upturned, the supraanal plate tolerably flat, triangular with straight sides, acutangulate apex, the median sulcus percurrent, with low bounding ridges which die out apically; furcula consisting of a pair of divergent, flattened, tapering, acuminate fingers, which hardly cross the basal third of the supraanal plate; cerci moderately large and broad, compressed, incurved laminae, a little more than three times as long as broad, a very little contracted mesially, the apical portion with its well-rounded tip more or less externally sulcate and narrower than the basal portion, reaching nearly to the tip of the supraanal plate; subgenital plate broad but not so broad as long, apically a little elevated, the apical margin well rounded, a little thickened and entire.

Length of body, male, 21 mm., female, 23 mm.; antennae, male, 11.5 mm., female, 10 mm.; tegmina, male, 21 mm., female, 22 mm.; hind femora, male, 13.25 mm., female, 15.25 mm.

Four males, 4 females. Fort Wingate, Bernalillo County, New Mexico (U.S.N.M.—Riley collection); Fort Whipple, Yavapai County, Arizona, E. Palmer.

13. RUSTICUS SERIES.

This is a tolerably homogeneous group in which the prozona of the male varies from quadrate to distinctly longitudinal and in which the mesosternal lobes of the same sex are separated by an interspace which is rarely a little transverse, usually quadrate or subquadrate, and rarely as much as nearly half as long again as broad. The hind border of the pronotum is usually very obtusangulate, and the tegmina always abbreviate, usually about as long as the pronotum. The hind tibiae are usually red, rarely pale greenish, with usually ten to eleven spines in the outer series, but sometimes nine or twelve, and in one case only seven spines may be found in the female.

The male abdomen is usually more or less clavate and recurved, the supraanal plate triangular, its median sulcus inclosed by high walls

which generally terminate beyond the middle; the furcula is usually developed as slight, tapering denticulations only, and in one case these disappear, but sometimes they are longer so as to be nearly or quite a fourth as long as the supraanal plate; the cerci are simple blades of moderate breadth, generally a little arcuate, tapering a little in the proximal, subequal in the distal half and rounded apically, not reaching the tip of the supraanal plate; the subgenital plate is small and the lateral and apical margins usually on the same plane, except for a slight apical elevation or angulation which may take the form of a tubercle, but in one species this also is wanting.

The species, mostly of medium or small size and seven in number, have a tolerably wide range in the western portion of the continent, from Washington, South Dakota, and Michigan to southern California, Texas, and Mexico; but with a single exception (Montana), the same district does not support two species. One species is found about and near the upper Mississippi, a second along the eastern border of the Rocky Mountains from Montana to New Mexico, a third in Montana, a fourth in Washington, and the others respectively in southern California, Texas, and Mexico.

53. MELANOPLUS MONTANUS.

(Plate XV, fig. 8.)

Platyphyma montana THOMAS!, Rep. U. S. Geol. Surv. Terr., V (1873), p. 155.—GLOVER, Ill. N. A. Ent., Orth. (1874), pl. XVIII, fig. 11.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 58.

Of medium size, blackish fuscous with a ferruginous tinge. Head not prominent, fusco plumbeous, the mouth parts paler, blackish fuscous above, with a broad postocular piceous band; vertex somewhat tumid, somewhat elevated above the pronotum, the interspace between the eyes fully half as broad again (male) or fully twice as broad (female) as the first antennal joint; fastigium steeply declivent, deeply (male) or rather shallowly (female) sulcate throughout; frontal costa lost before the clypeus, subequal, rather narrower than the interspace between the eyes, slightly (male) or distinctly (female) sulcate at and for a brief distance below the ocellus, rather heavily punctate throughout, the larger puncta above the ocellus arranged biserially and laterally; eyes not very prominent but a little more so in the male than in the female, of moderate size, as long as the infraocular portion of the genae; antennae nearly as long as the hind femora in the male. Pronotum subequal, feebly expanding posteriorly in the female, the lower portion of the lateral lobes dull dark testaceous in contrast to the piceous band of the upper half, which is not lost (though obscured) on the metazona, the disk rather broadly convex, passing (on the prozona insensibly, on the metazona with a rounded shoulder) into the subvertical lateral lobes; median carina distinct on the metazona, obsolete on the prozona; front margin truncate, hind margin broadly obtusangulate, the angle well rounded; prozona feebly longitudinal (male) or transverse (female).

a little longer than the rather feebly punctate metazona. Prosternal spine short, transverse, apically subtruncate; interspace between mesosternal lobes a little transverse, much narrower than the lobes, alike in both sexes, the metasternal lobes subattinent (male) or rather distant (female). Tegmina abbreviate, about as long as the pronotum, attinent, ovato-fusiform, broader in the female than in the male, apically acuminate, blackish ferruginous. Fore and middle femora considerably tumid in the male; hind femora very dull brownish testaceous, heavily bifasciate with blackish fuscous, the premedian fasciation angulate on the outer face, the whole geniculation, except sometimes the tip of the lower genicular lobe blackish, the inferior face dull flavous; hind tibiae red, the extreme base and a subbasal annulation fuscous, the spines black almost to their very base, ten in number in the outer series. Extremity of male abdomen distinctly clavate, considerably recurved, the supraanal plate triangular with slightly convex, basally-raised lateral margins, acutangulate apex and moderately broad and deep equal median sulcus extending over a little more than the basal half of the plate, its bounding ridges sharp and moderately high; furcula consisting of a pair of approximate, slight but rather coarse, parallel denticulations, shorter than the last dorsal segment; cerci rather small, subfalcate, being slightly curved upward but not incurved, tapering somewhat in the basal half, beyond equal and two-thirds as broad as the extreme base, the tip well rounded, shorter than the supraanal plate; subgenital plate small, subconical, apically subtuberculate, moderately narrow, subequal, the margin as seen from above well rounded, entire.

Length of body, male, 19 mm., female, 26 mm.; antennae, male, 9 mm.; tegmina, male, 5 mm., female, 5.5 mm.; hind femora, male, 9.5 mm., female, 11.5 mm.

Three males, 2 females. Montana (L. Bruner; U.S.N.M.—Riley collection).

I formerly¹ gave Thomas's name of this species to *M. monticola*, q. v.

54. MELANOPLUS WASHINGTONIANUS.

(Plate XV, fig. 9.)

Pezotettix washingtonianus BRUNER!, Can. Ent., XVII, 1885, pp. 14-15.

Of medium size, rather stout-bodied, brownish fuscous tinged with ferruginous, flavo-testaceous beneath. Head not prominent, fusco-testaceous with a feeble olivaceous tinge, brownish fuscous above, sometimes blotched with testaceous, with a broad postocular piceous band; vertex gently tumid, feebly elevated above the pronotum, the interspace between the eyes nearly (male) or fully (female) twice as broad as the first antennal joint; fastigium steeply declivent, deeply (male) or moderately (female) and broadly sulcate; frontal costa failing to reach the clypeus, subequal but slightly contracted above, especially in the

¹ Appalachia, I, 263.

male, a little narrower than the interspace between the eyes, sulcate at and below the ocellus, punctate throughout like the rest of the face and genae; eyes of moderate size, only moderately prominent even in the male, scarcely longer than the infraocular portion of the genae; antennae castaneous becoming slightly infuscated apically, considerably more (male) or slightly less (female) than two-thirds as long as the hind femora. Pronotum subequal, faintly enlarging posteriorly, especially in the female, the prozona with a broad postocular piceous band, beneath which the lateral lobes are dull flavo-testaceous, the disk broadly convex, passing by a broadly rounded angulation nowhere forming lateral carinae into the vertical lateral lobes; median carina distinct but very low on the metazona, subobsolete on the prozona except at the extreme front; front margin truncate, hind margin obtusangulate; prozona quadrate or feebly longitudinal (male) or feebly transverse (female), a little (male) or scarcely (female) longer than the ruguloso-punctate metazona. Prosternal spine moderately large, stout, appressed conical, very blunt, slightly retrorse; interspace between mesosternal lobes subquadrate, a little longer than broad (male) or transverse, but narrower than the lobes (female). Tegmina abbreviate, about as long as the pronotum, overlapping, broad subovate, the costal margin convex, the apex acuminate, brownish fuscous, minutely flecked with fuscous. Fore and middle femora considerably tumid in the male; hind femora rather robust, testaceous, rather narrowly bifasciate with fuscous, the premedian fasciation angulate on the outer face, the geniculation fuscous, the lower face pale flavous; hind tibiae red, generally rather pale red, with an obscure fuscous patellar spot, the spines black beyond their base, ten to eleven, rarely twelve, in number in the outer series. Extremity of male abdomen a little clavate, considerably recurved, the supraanal plate triangular, the apex acutangulate, the median sulcus straight, rather narrow and moderately deep, extending over the basal three-fifths of the plate between narrow and sharp ridges, terminating abruptly; furcula consisting of a pair of slight spinous denticulations shorter than the last dorsal segment, overlying the base of the submedian ridges of the supraanal plate; cerci small, subfalcate, slightly upturned but otherwise straight lamellae, tapering gently from the base nearly or quite to the middle, beyond equal, about two-thirds as broad as the extreme base, apically rounded or subtruncate, much shorter than the supraanal plate; subgenital plate small, rudely subconical, terminating in a feeble blunt tubercle.

Length of body, male, 20 mm., female, 24 mm.; antennae, male, 8 mm., female, 7.5 mm.; tegmina, male, 6.25 mm., female, 6 mm.; hind femora, male, 11 mm., female, 12.25 mm.

Four males, 3 females. Loon Lake, Colville Valley, Washington. July 23-25, S. Henshaw (Museum Comparative Zoology; U.S.N.M.—Riley collection).

55. MELANOPLUS WALSHII, new species.

(Plate XV, fig. 10.)

Pezotettix scudderi WALSH!, MS.

Rather above the medium size, cinereo-fuscous. Head not prominent, dull testaceous, more or less infuscated, especially above, with a distinct or obsolete piceous postocular band; vertex gently tumid, feebly elevated above the pronotum, the interspace between the eyes almost (male) or much more than (female) twice as broad as the first antennal joint; fastigium steeply declivent, broadly and moderately (male) or very shallowly (female) sulcate; frontal costa hardly reaching the clypeus, equal, a little (male) or distinctly (female) narrower than the interspace between the eyes, faintly and broadly sulcate at and below the ocellus, punctate throughout, but above particularly in lateral series; eyes not very large, moderately prominent, particularly in the male, the front margin truncate in the female, a little (female) or distinctly (male) longer than the infraocular portion of the genae; antennae testaceous, basally lutescent, apically fuscous, slightly more than two-thirds as long as the hind femora in the female. Pronotum equal except for a feeble posterior enlargement of the metazona, the sides with a very broad piceous postocular band crossing the prozona and, obscurely, also the metazona (male) or with scarcely the slightest trace of the same, but at most a growing depth of tint at the upper limit of the lateral lobes (female), the disk plano-convex, passing into the subvertical lateral lobes by a well but abruptly rounded angulation, forming dull lateral carinae; median carina distinct but low on the metazona, obsolete on the prozona except sometimes a slight appearance at extreme front; front margin truncate, hind margin strongly obtusangulate; prozona distinctly longitudinal (male) or quadrate or subquadrate (female), much longer than, generally half or nearly half as long again as, the ruguloso-punctate metazona. Prosternal spine moderately long and stout, especially in the female, appressed conical, not very blunt, erect; interspace between mesosternal lobes truncato-coneiform, quadrate (male) or distinctly transverse but narrower than the lobes (female). Tegmina abbreviate, a little longer than the pronotum, overlapping, with angularly separated dorsal and lateral fields, particularly in the male, ovate-lanceolate, apically bluntly acuminate, the costal margin rotundato-angulate, cinereo fuscous, the dorsal field often wholly cinereous; wings briefer than the tegmina. Fore and middle femora not greatly tumid in the male; hind femora testaceous or luteo-testaceous, rather broadly and distinctly bifasciate with fuscous or blackish fuscous, sometimes suffused on the upper face, the inferior face pale reddish, the genicular arc black; hind tibiae bright red, at extreme base infuscated, with a fuscous patellar spot, followed beyond by a broad but not very conspicuous pallid annulus, the spines

black beyond the base, ten to eleven, rarely nine or twelve, in the outer series. Extremity of male abdomen rather strongly clavate, considerably recurved, the supraanal plate triangular, with feebly elevated lateral margins and bluntly acutangulate apex, the median sulcus narrow, deep, and equal, between high but rounded walls, terminating a little beyond the middle of the plate and leaving the tip cochlearate; furecula consisting of a pair of minute slender denticulations overlying the submedian ridges of the supraanal plate; cerci subequal, tapering in the basal fourth only, beyond enlarged to the slightest degree, gently incurved throughout but otherwise nearly straight, feebly sulcate exteriorly at the rounded apex, falling well short of the tip of the supraanal plate; subgenital plate small, narrowed feebly in the middle of either side, the apical margin gradually and gently elevated, entire, well rounded as seen from above.

Length of body, male, 20 mm., female, 23 mm.; antennae, female, 10.5 mm.; tegmina, male, 7 mm., female, 8.5 mm.; hind femora, male, 11 mm., female, 15 mm.

One male, 7 females. Michigan, M. Miles; Rock Island, Illinois, B. D. Walsh; Dallas County, Iowa, August, J. A. Allen.

This species was determined in 1865 by the late B. D. Walsh as *Pez. scudderii* Uhler, described from the same place but quite distinct. It is possible that the two sexes here described belong to two different species, as there is considerable and unusual difference between them in the shape of the eye and the character of the postocular band; but they agree so well otherwise, and show the same pallid annulus on the hind tibiae, that I regard them as the same. If distinct, the name here applied should be given to the female, as only the female was received from Walsh. The male comes from Michigan.

56. MELANOPLUS ALTITUDINUM.

(Plate XVI, fig. 1.)

Pezotettix marshi SCUDDER!, Ann. Rep. Chief Eng., 1876 (1876), p. 502; Ann.

Rep. Geogr. Surv. 100th Mer., 1876 (1876), p. 282.

Pezotettix altitudinum SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), p. 86; Cent. Orth. (1879), p. 75.

Pezotettix sanguinipes BRUNER!, Publ. Nebr. Acad. Sc., III (1893), p. 27—undescrib.

Of medium (male) or moderately large (female) size, there being unusual disparity between the sexes, blackish griseous, ferrugineo-testaceous beneath. Head not prominent, ferrugineo-testaceous below, passing into blackish fuscous above, with a broad, piecous postocular band; vertex somewhat turrit, elevated but little above the pronotum, the interspace between eyes nearly twice (male) or nearly thrice (female) as broad as the first antennal joint; fastigium not very steeply declivent, rather deeply (male) or very shallowly (female) sulcate; frontal costa failing to reach the clypeus, equal or subequal, much narrower than the interspace between the eyes, sulcate at and below the ocellus particularly in the male, punctate throughout like the rest of the face

and genae; eyes not very large, moderately (female) or distinctly (male) prominent, scarcely longer (male) or a little shorter (female) than the infraocular portion of the genae; antennae castaneous, apically fuscous, a little more than (male) or about (female) two thirds as long as the hind femora. Pronotum subequal, feebly and gradually enlarging posteriorly, the lateral lobes with a broad piceous postocular band confined to the prozona and sometimes followed beneath by lighter spots, the disk plano-convex, passing into the vertical lateral lobes by a distinct but rounded angulation forming dull lateral carinae, most distinct on the posterior section of the prozona; median carina distinct and moderately high on the metazona, subobsolete on the prozona, often obsolete between the sulci; front margin truncate, hind margin obtus-angulate, the angle broadly rounded in the female; prozona slightly longitudinal (male) or distinctly transverse (female), considerably (male) or not (female) longer than the ruguloso-punctate metazona. Prosternal spine rather short, conical with a blunt point, suberect; interspace between mesosternal lobes subquadrate (male) or transverse, as broad as the lobes (female), the metasternal lobes approximate (male) or distant (female). Tegmina somewhat abbreviate, attaining about the middle of the hind femora, overlapping, long lanceolate, very roundly acuminate at tip, the dorsal field more or less ferrugineo-testaceous, the rest blackish griseous, the whole profusely sprinkled with blackish fuscous spots; wings a little shorter than the tegmina. Fore and middle femora, and especially the latter, a little tumid in the male; hind femora testaceous or ferrugineo-testaceous, rather narrowly bifasciate with blackish fuscous, the geniculation fuscous, the lightest region of the femora being a not very broad, dull flavo testaceous, pregenicular annulation, the inferior surface and lower part of inner surface very dark red; hind tibiae dark and generally bright red, with a narrow fuscous patellar annulation, the spines black almost to their very base, ten to eleven, rarely nine, in number in the outer series. Extremity of male abdomen clavate, considerably recurved, the supraanal plate triangular, the apex acutangulate, the basal half or more of the lateral margins feebly convex and feebly and broadly elevated, the median portion of the basal three-fifths of the plate broadly elevated and provided with a deep and equal median sulcus; furcula consisting of a pair of distant, feeble, blunt denticulations, much shorter than the last dorsal segment; cerci slender, and tapering rapidly on the basal fourth or third, mainly by the excision of the upper margin, beyond subequal, gently incurved and faintly curved upward, apically rounded, faintly sulcate exteriorly at tip, but failing to reach the tip of the supraanal plate; subgenital plate subconical, nearly as broad as long, apically tuberculate.

Length of body, male, 20 mm., female, 28 mm.; antennae, male, 8 mm., female, 9 mm.; tegmina, male, 9.5 mm., female, 10 mm.; hind femora, male, 11.5 mm., female, 13 mm.

Thirteen males, 16 females. Montana (U.S.N.M.—Riley collection); Fort Ellis, Montana, July 29–30 (same); Englewood, Lawrence County, South Dakota, Haggard (L. Bruner); Custer, Black Hills, South Dakota, Bruner (U.S.N.M.—Riley collection); Harneys Peak, South Dakota, 7,000 to 8,000 feet, Bruner (same); Fort McKinney, Johnson County, Wyoming, July (same); Sheridan, Wyoming, August 12, L. Bruner; Poudre River, Colorado, June (U.S.N.M.—Riley collection); southern Colorado, June 11–20, Lieutenant Carpenter (same; S. H. Scudder); Taos Peak, Sangre de Cristo Mountains, New Mexico, 13,000 feet, Carpenter (U.S.N.M.—Riley collection).

It is also credited to Pine Ridge, in the extreme northwestern part of Nebraska (Bruner).

57. *MELANOPLUS GRACILIPES*, new species.

(Plate XVI, fig. 2.)

Pezotettix gracilipes McNEILL!, MS.

Of small size and slender form, fusco-testaceous, more or less ferruginous. Head not prominent, testaceous, more or less heavily and distinctly punctate with fuscous, generally fuscous above, with a broad, fuscous, postocular band; vertex feebly tumid, scarcely elevated above the pronotum, the interspace between the eyes narrow, not (male) or scarcely (female) wider than the first antennal joint; fastigium steeply declivent, moderately sulcate; frontal costa fading before the clypeus, equal or subequal, as wide as (female) or slightly wider than (male) the interspace between the eyes, sulcate at and below the ocellus, punctate throughout and more or less biserially; eyes moderately large, rather prominent, much longer than the infraocular portion of the genae; antennae testaceous, about four-fifths (male) or one-half (female) as long as the hind femora. Pronotum subequal, faintly enlarging posteriorly, the lower portion of the lateral lobes testaceous, the upper occupied by a piceous postocular stripe which only crosses the prozona, the disk broadly convex, passing into the subvertical lateral lobes by a rounded but abrupt angulation, which forms very blunt percurrent lateral carinae; median carina distinct but low, percurrent, hardly more distinct on the metazona than on the prozona; front margin faintly convex, hind margin subtruncate but faintly angulate; prozona distinctly longitudinal (male) or transverse (female), more than half as long again as the densely and very distinctly punctate metazona. Prosternal spine moderately long, erect, appressed, conical, blunt; interspace between mesosternal lobes nearly half as long again as broad (male) or transverse, but much narrower than the lobes (female). Tegmina abbreviate, about as long as the pronotum, broad ovate, attingent, apically angulate, brownish fuscous. Fore and middle femora slightly tumid in the male; hind femora long and slender, dull testaceous, sometimes with a ferruginous tinge, more or less sprinkled with fuscous dots, which when most profuse are collected in two oblique fasciations seen most clearly

on the upper face, the lower face pale red, the geniculation hardly infuscated; hind tibiae pale testaceous with a faint greenish tinge, especially upon the upper half, often minutely flecked with fuscous, the spines pallid at base and black at tip, ten to eleven in number in the outer series. Extremity of male abdomen clavate, considerably recurved, the supraanal plate triangular or subnastate with acutangulate apex, the lateral margins broadly and gently elevated on the basal half, the median sulcus percurrent, deep basally and gradually shallowing; furcula consisting of a pair of parallel, approximate, slender, acuminate spines, less than one-fourth the length of the supraanal plate; cerci small, slender, tapering gently on basal third, beyond equal, nearly straight but feebly incurved, well rounded at tip, much shorter than the supraanal plate; subgenital plate small, subequal, a little longer than broad, the lateral and apical margins in the same plane, angulate as seen from above.

Length of body, male, 14 mm., female, 18 mm.; antennae, male, 7 mm., female, 4.75 mm.; tegmina, male, 4.25 mm., female, 4.5 mm.; hind femora, male, 9 mm., female, 10 mm.

Three males, 1 female. Los Angeles, California, Coquillett (U.S.N.M.—Riley collection; L. Bruner).

58. MELANOPLUS GENICULATUS, new species.

(Plate XVI, fig. 3.)

Of every small size, fusco-testaceous, the legs and under surface flavous. Head rather prominent, especially in the male, flavous, more or less feebly punctate with fuscous, above with a pair of divergent obscure fuscous stripes; vertex gently tumid, slightly elevated above the pronotum, the interspace between the eyes scarcely (male) or only (female) as wide as the first antennal joint; fastigium steeply declivent, rather deeply sulcate, broadening anteriorly to double the basal width; face considerably oblique, the frontal costa fading just before the clypeus, equal except for a slight contraction above, a little broader than the interspace between the eyes, distinctly sulcate throughout excepting above, feebly and biserially punctate; eyes large, prominent, much longer than the infraocular portion of the genae; antennae rufo-testaceous, almost as long (male) or a little more than two-thirds as long (female) as the hind femora. Pronotum subequal on the prozona, flaring a little on the metazona, with no piceous postocular band, the lateral lobes short and nearly unicolorous, the disk broadly convex and passing insensibly into the vertical lateral lobes; median carina faint and slight on the metazona, obsolete on the prozona, especially in the male; front margin truncate or subtruncate, hind margin truncate and very feebly and broadly emarginate; prozona distinctly punctate and transversely rugose, at least in the male, subquadrate, almost twice as long as the densely and rather heavily punctate metazona. Prosternal spine of moderate size, erect, strongly appressed conical; interspace between mesosternal lobes quadrate (male) or transverse but much

narrower than the lobes (female). Tegmina abbreviate, much shorter than the pronotum, lateral and widely distant, obovate, twice as broad as long, well rounded apically. Fore and middle femora somewhat tumid in the male; hind femora uniformly flavous with a faint greenish tinge, the entire geniculation and base of tibiae black; rest of hind tibiae greenish yellow, the spines black beyond the base, seven (female) to nine (male) in number in the outer series. Extremity of male abdomen scarcely clavate, somewhat recurved, the supraanal plate subtriangular with sinuous sides and rounded subrectangulate apex, the surface subtectate, rising to the sharp submedian ridges which inclose the percurrent but mesially interrupted median sulcus; furcula obsolete, represented by mere disk-like thickenings of the inner portion of the divided halves of the last dorsal segment; cerci small, moderately slender, subequal, nearly straight but incurved, apically truncate, shorter than the supraanal plate; subgenital plate very small and very short, of very unequal breadth, the lateral and apical margins on the same plane, as seen from above angulate.

Length of body, male, 12.25 mm., female, 14.5 mm.; antennae, male, 8 mm., female, 6.5 mm.; tegmina, male, 2.5 mm., female, 2 mm.; hind femora, male, 8.75 mm., female, 9 mm.

One male, 1 female. Mexico, W. S. Blatchley.

59. MELANOPLUS RUSTICUS.

(Plate XVI, fig. 4.)

Pezotettix rusticus STÅL, Bih. K. Sv. Vet.-Akad. Handl., V, No. 9 (1878), p. 13.

I have not seen this species, but by the courtesy of Doctor Aurivillius I am able to give an illustration of the male abdominal appendages. Stål's description is as follows:

Praecedenti [Mel. plebejus] simillimus, differt oculis nonnihil minoribus, antennis longioribus, vitta laterali pronoti percurrente, forma intervalli sternorum, lobis genicularibus femorum posticorum nigris, tantum apice imo pallidis nec non forma partium analium maris. ♂, ♀. Long. 20 mill.

♂. Antennae femoribus posticis vix breviores; oculi majusculi, modice convexi; intervallum loborum mesosternalium anterius lobis dimidio angustius, retrorsum sensim ampliatum; lobi mesosternales leviter transversi; lobi metasternales fortiter appropinquati; abdomen posterius haud vel vix tumescens, apice levissime recurvum; segmentum dorsale ultimum e medio lobos duos sat longos, sensim aenunatos, divaricatos, emittens; lamina supraanal triangularis paullo longior quam basi latior, lateribus leviter rotundatis instructa, apice angulum subacutum formans, sulco longitudinali ante medium distincto, pone medium obsoleto instructa, prope latera longitudinaliter impressa; cerci compressi, latiusculi, basi sensim nonnihil angustati, dein ubique aequales, posterius extus leviter excavati; lamina subgenitalis brevis, fortiter recurva, sinuato-truncata, macula parva apicali nigra notata.

♀. Antennae femoribus posticis nonnihil breviores; oculi minores; lobi mesosternales transversi, intervallo circiter duplo latiores; intervallum loborum mesosternalium utrinque sinuatum, prope basin angustius, hinc retrorsum ampliatum; lobi metasternales sat distantes."

Patria: Texas. (Mus. Holm.)

Stål places this species in his fourth division of the genus *Pezotettix*, which he regards as equivalent to *Paroxya* Scudder, and which he defines

merely in terms of the abdominal appendages of the male; it is, therefore, not equivalent to *Paroxya* as I formerly defined it and as I here still more closely distinguish it from the other genera.

14. BORCKII SERIES.

A homogeneous group in which the prozona of the male is distinctly longitudinal and from a third to a half longer than the metazona, the posterior margin of the pronotum being subtruncate. The interspace between the mesosternal lobes in the same sex varies from a little longer than broad to twice as long as broad. The antennae vary considerably in length, but generally differ but little between the two sexes. There is also little diversity between the sexes in the prominence of the eyes. The hind tibiae are dark blue, sometimes purplish, and have nine to twelve spines in the outer series.

The supraanal plate is triangular with acutangulate or rectangulate apex; the furcula is reduced to mere projecting points; the cerci are broad and swollen at the base, taper rapidly, and terminate in a slender, produced, more or less curling finger; the supraanal plate is either very narrow as compared to its length and then deeply hollowed apically, with a strongly sinuate lateral margin, or it is only a little longer than broad with a nearly straight margin, the apical margin always entire.

There are six species, ranging from rather small to a little above the medium size, and they are mainly confined to the Pacific coast from Washington to California. But one of the species occurs also as far inland as Idaho and Wyoming, and another is known from San Luis Potosi, Mexico.

60. MELANOPLUS PACIFICUS.

(Plate XVI, fig. 5.)

Pezotettix pacificus SCUDDER!, Rep. U. S. Ent. Comm., II (1881). App., pp. 24-25, pl. XVII, fig. 16.—BRUNER, *ibid.*, III (1883), p. 59.

Of medium or slightly less than medium size, ferrugineo-fuscous above, flavo-testaceous beneath. Head scarcely prominent, flavo-testaceous, heavily punctate with fuscous, above also faintly clouded with fuscous, with a broad piceous postocular band; vertex gently tumid, a little elevated above the pronotum, the interspace between the eyes nearly half as broad again (male) or nearly twice as broad (female) as the first antennal joint; fastigium rather steeply declivent, distinctly (male) or feebly (female) sulcate throughout with weak anterior termination; frontal costa subobsolete below, subequal, but above slightly narrowed, about as broad as the interspace between the eyes, a little sulcate at and sometimes a short distance below the ocellus, punctate throughout; eyes moderate in size, not very prominent, scarcely more so in the male than in the female, a little longer than the infraocular

portion of the genae; antennae luteo-testaceous, gradually darkening from base to apex, nearly two-thirds (male) or three-fifths (female) as long as the hind femora. Pronotum subequal, faintly expanding posteriorly, the disk ferrugineo-fuscous, sometimes testaceous flecked with fuscous, gently convex transversely and passing by an abrupt but rounded shoulder, scarcely forming lateral carinae, into the slightly tumid subvertical lateral lobes; these are flavo-testaceous on the lower, piceous on the upper half, the division line between the colors sharp, areolate; median carina sharp and distinct on metazona, feeble on prozona, and sometimes obsolete between the sulci; front margin truncate, hind margin feebly produced, subtruncate; prozona distantly, coarsely, and shallowly punctate, feebly convex anteroposteriorly, longitudinal, nearly one-half (male) or about one-third (female) longer than the closely and rather finely punctate metazona. Prosternal spine small, stout, conical, and rather sharply pointed (male) or blunt (female); interspace between mesosternal lobes fully half as long again as broad (male) or fully half as broad again as long but narrower than the lobes (female); ridge of metathoracic episterna flavous like the mesothoracic, piceous between. Tegmina abbreviate, shorter than the pronotum, in the female scarcely longer than the prozona, very broadly ovate, very broadly rounded apically, attinent or subattinent, brownish fuscous, the anal area often cinereous. Fore and middle femora very tumid in the male; hind femora rather stout and plump, ferrugineo-testaceous, sometimes immaculate, sometimes obscurely and brokenly trifasciate with blackish fuscous above, sometimes the whole outer face completely infuscated (the carinae sometimes flavescens), the inferior surface flavous or pale sanguineous, the geniculation feebly infuscated; hind tibiae very dark glaucous or bronze green, sometimes with a narrow fuscous patellar annulus, the spines long, pallid on basal, blackish on apical half, ten to eleven, rarely nine or twelve, in the outer series. Abdomen flavous, testaceous or ferruginous, the sides marked with piceous, in the male sharply delimited in a narrowing band; extremity in the male clavate, considerably recurved, the supraanal plate triangular, expanded at extreme base, the apex acutangulate, the lateral margins broadly elevated, the median sulcus very broad at base, rapidly narrowing so that at and beyond the middle it is very slender, the arcuate bounding ridges high and sharp; furcula reduced to the slightly projecting inner angles of the divided halves of the last dorsal segment; cerci strongly compressed, very broad and rounded on basal half, with marginal borders, and a little tumid in the middle, the apical half subcylindrical, slender, tapering, pointed, not one-third the width of the base, the whole not more than half as long again as broad and hardly attaining the tip of the supraanal plate; subgenital plate much longer than broad, with very convex lateral margins, deeply hollowed and entire apical margin, the margins quadrate as seen from above.

Length of body, male, 18 mm., female, 19 mm.; antennae, male, 6.5

mm., female, 6.75 mm.; tegmina, male and female, 4 mm.; hind femora, male, 10.5 mm., female, 11.25 mm.

Four males, 7 females. Siskiyou County, California (U.S.N.M.—Riley collection); Edgewood, Siskiyou County, California (L. Bruner); Sissons, Siskiyou County, Packard; Mount Shasta, California (L. Bruner); Shasta County, California, June, J. Behrens (same); Santa Cruz Mountains, California (U.S.N.M.—Riley collection); mountains near Lake Ta'hoë, California, September, Henshaw, Wheeler's Expedition, 1876.

This species may readily be confounded with the following: it is a little smaller and somewhat slenderer than *M. borekii*, and differs also in the points mentioned in the table.

61. MELANOPLUS BORCKII.

(Plate XVI, fig. 6.)

Acridium (Podisma) borekii STÅL, Orth. Eug. Res. (1861), p. 332.

Podisma borekii WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 718.

Pezotettix (Melanoplus) borekii STÅL, Recens. Orth., I (1873), p. 79.

Pezotettix borekii THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 149.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59; Can. Ent., XVII (1885), p. 12; Bull. Div. Ent. U. S. Dep. Agric., IV (1884), p. 58.

Of fully medium size, ferrugineo-fuscous, dull testaceous beneath. Head scarcely prominent, flavous, often more or less clouded with fuscous, above always more or less brownish fuscous, occasionally punctate or streaked with black, rarely with any sign of a postocular band; vertex very gently tumid, feebly elevated above the pronotum, the interspace between the eyes fully half as broad again (male) or twice as broad (female) as the first antennal joint; fastigium moderately declivent, sulcate throughout but more feebly in the female than in the male; frontal costa fading before the clypeus, equal but for the slight narrowing above, as broad as the interspace between the eyes, slightly sulcate at and sometimes shortly below the ocellus, punctate throughout like the rest of the face and genae; eyes of moderate size, feebly tumid and scarcely more so in the male than in the female, only a little longer than the infraocular portion of the genae; antennae luteous or rufous, becoming dusky apically, slightly more than half (male) or about three-fifths (female) as long as the hind femora. Pronotum distinctly enlarging posteriorly especially in the female, of nearly uniform color but becoming dull fusco-testaceous on the lower part of the lateral lobes, and sometimes, and especially in the male, with a broad, dull piceous, postocular band confined to the prozona, the disk broadly convex and separated by a distinct and tolerably sharp angulation, forming rather distinct lateral carinae, from the gently tumid but otherwise subvertical lateral lobes; median carina distinct, percurrent but feebler on the prozona, and feeblest and sometimes subobsolete between the sulci; front margin truncate or faintly convex, hind margin truncate or feebly rounded, rarely subangulate; prozona distinctly (male) or feebly (female)

longitudinal, feebly convex antero-posteriorly, fully a half (male) or about a third (female) longer than the closely and finely punctate metazona. Prosternal spine rather stout, conical, a little blunter in the female than in the male; interspace between mesosternal lobes longitudinally subquadrate or somewhat longer than broad (male) or transversely subquadrate or feebly transverse (female). Pleura marked as in *M. pacificus*. Tegmina a little or considerably shorter than the pronotum, broad or very broad oval, attingent or subattingent, well rounded apically, usually half as long again as broad but sometimes little longer than broad, especially in the female, brownish fuscous. Fore and middle femora very tumid in the male; hind femora ferrugineo-fuscous, very obliquely bifasciate with blackish fuscous, the proximal fasciation usually narrow, the distal broad, sometimes more or less suffused on the outer face, the genicular arc black, the lower surface sanguineous, though the outer half is sometimes flavous; hind tibiae very dark bluish purple, sometimes dull dark glaucous and then with a broad, subbasal, pallid annulation, the spines long, pallid at base, the apical half or more black, ten to eleven, rarely nine, in number in the outer series. Extremity of male abdomen clavate, strongly recurved, the supraanal plate precisely as in *M. pacificus*; furcula as there, but slightly more prominent; cerci broad, somewhat rounded and tumid at base, in the middle third tapering rapidly, the apical third subequal, very slender, incurved and a little arcuate as seen from the side, the tip bluntly pointed and almost attaining the tip of the supraanal plate, scarcely differing from the same parts in *M. pacificus*; subgenital plate as there, but the lateral margins rather angulate than rounded at base.

Length of body, male, 19 mm., female, 24.5; antennae, male, 6.75 mm., female, 8 mm.; tegmina, male, 4.5 mm., female, 5 mm.; hind femora, male, 13 mm., female, 14 mm.

Eight males, 12 females. California, Ricksecker (S. Henshaw); California, Behrens (U.S.N.M.—Riley collection); Sonoma and Marin counties, California, Baron Osten Sacken; Sauzalito, Marin County, California, July 26, September, Behrens; Santa Cruz Mountains, California (U.S.N.M.—Riley collection); Los Angeles, California, Coquillett (L. Bruner); between San Luis Obispo and San Simeon Bay, California, E. Palmer.

It has also been reported from Washington, Montana, Idaho, and Wyoming by Bruner.

62. MELANOPLUS TENUIPPENNIS, new species.

(Plate XVI, fig. 7.)

Pezotettix tenuipennis McNEILL!, MS.

Of medium or rather above the medium size, the female robust, rather dark testaceous. Head not prominent, testaceous, feebly and sparsely punctate with fuscous, above sometimes faintly infuscated especially along the middle, and with faint and narrow or no postocular band:

vertex gently tumid, but little elevated above the pronotum. the interspace between the eyes half as broad again (male) or twice as broad (female) as the first antennal joint; fastigium moderately declivent, rather shallowly (male) or scarcely (female) sulcate; frontal costa fading before the clypeus, subequal, about as broad as the interspace between the eyes, scarcely sulcate (male) or feebly sulcate at and below the ocellus (female), punctate throughout; eyes moderate in size, not very prominent, only a little longer than the infraocular portion of the genae; antennae testaceous or rufo-testaceous, more than two-thirds (male) or about one-half (female) as long as the hind femora. Pronotum distinctly enlarging from in front backward particularly in the female, the disk broadly convex, subteetiform, passing by an abrupt angle forming distinct lateral carinae into the anteriorly feebly tumid vertical lateral lobes, the lateral carinae faintly marked with flavous or rufous, followed beneath at least on the prozona with a narrow bordering of black, occasionally extending, but generally as a feeble suffusion, over the upper half of the lateral lobes; median carina percurrent, sharp on the metazona, dull but distinct on the prozona, except that it is always feebler and sometimes subobsolete between the sulci; front margin truncate, hind margin truncate but mesially emarginate, especially in the female; prozona subequal and distinctly longitudinal (male) or tapering and longitudinally subquadrate (female), fully (male) or less than (female) half as long again as the closely and heavily punctate metazona. Prosternal spine long, slender, erect, conical (male) or moderately long, stout, conical, rather blunt, erect (female); interspace between mesosternal lobes somewhat variable, being from half as long again to fully twice as long as broad (male) or subquadrate either longitudinally or transversely (female). Tegmina much shorter than the pronotum, distant, lateral, elliptical, varying from hardly more than half as long again as broad to more than twice as long as broad, apically well rounded, brownish fuscous. Fore and middle femora considerably tumid in the male; hind femora rather stout but pretty long, testaceous, generally with feeble remnants of bifasciation with fuscous, especially on the outer face and upper half of inner face, the lower half of the latter with the inferior face saugineous, the genicular arc fuscous; hind tibiae paler or darker glaucous, sometimes a little infuscated, the basal third sometimes with a postbasal flavous annulation, the spines pallid on basal, black on apical half, nine to twelve in number in the outer series. Extremity of male abdomen clavate, considerably recurved, the supranal plate triangular with rectangulate apex and straight sides, the surface nearly plane, the median sulcus occupying at base a large flat triangular field (represented far too small in our figure), beyond which it continues to the tip as a feeble slit; furcula consisting of a pair of approximate, slight, blunt denticulations; cerci broad at base, tapering pretty regularly and somewhat rapidly, the apical third subequal and very slender, not a fourth the width of the base, a little twisted and

incurved, the tip bluntly angulate below, the whole fully twice as long as basal breadth; subgenital plate long and narrow, narrowest in the middle, the lateral margins ampliate and well rounded at the base, and as a whole sinuate, rising again at the apex, the apical margin as seen from behind broadly angulate, entire.

Length of body, male, 16 mm., female, 26 mm.; antennae, male, 7 mm., female, 8 mm.; tegmina, male, 3 mm., female, 4.75 mm.; hind femora, male, 10 mm., female, 15.5 mm.

Three males, 5 females. Monterey County, California, M. R. Curran (L. Bruner); Los Angeles, California, Coquillett (same); Los Angeles County, California, Koebele (same); San Bernardino County, California, August 18 (U.S.N.M.—Riley collection); Kern County, California (U.S.N.M.).

As there is considerable variation in the slenderness of the tegmina, the name given by McNeill is not closely applicable.

It is possible that the single female from Monterey County does not belong here, as it varies from the others, as indicated in part by the description, in having a subbasal annulus on the hind tibiae, and has considerably broader tegmina than any of the others and hardly any trace of markings on the hind femora. If it is distinct, it indicates an undescribed species of this same series very closely allied to the present.

63. MELANOPLUS MISSIONUM, new species.

(Plate XVI, fig. 8.)

Of average size, dark, ferrugineo-fuscous. Head feebly prominent, at least in the male, testaceous, heavily punctate with fuscous, above blackish fuscous, enlivened by a testaceous stripe following the margin of the eye posteriorly, and separating the fuscous summit from the broad piceous postocular band; vertex gently tumid, distinctly elevated above the level of the pronotum, the interspace between the eyes nearly (male) or fully (female) half as broad again as the first antennal joint; fastigium somewhat declivent, throughout distinctly (male) or scarcely (female) sulcate; frontal costa rather prominent, almost reaching the clypeus, equal or, in the male, sometimes feebly narrowed above, slightly broader than the interspace between the eyes, feebly sulcate at, and in the male below, the ocellus, rather closely punctate throughout like the rest of the face; eyes moderately large, slightly prominent, much longer than the infraocular portion of the genae; antennae luteo-testaceous, about three-fourths (male) or more than three-fifths (female) as long as the hind femora. Pronotum feebly expanding posteriorly, the disk broadly convex, passing by a distinct though slight ruga or rough angulation into the vertical lateral lobes, these lateral carinae marked, at least in the male, by a slender flavous stripe, followed beneath on the lateral lobes by a slender (female) or broad but posteriorly narrowing (male) piceous postocular band, mostly or wholly confined to the prozona; median carina percurrent and distinct, but duller on the

prozona, though in the female, excepting between the sulci, it is nearly as elevated though not so sharp as on the metazona; front margin subtruncate, hind margin produced, but broadly truncate, with the faintest possible indication of emargination; prozona distinctly longitudinal (male) or longitudinally subquadrate (female), very faintly and sparsely punctate, about half as long again as the closely and sharply punctate metazona. Prosternal spine moderately long, conical, rather blunt; interspace between mesosternal lobes about twice as long as broad (male) or quadrate (female.) Tegmina abbreviate, much shorter than the pronotum, rather distant, obovate, nearly twice as long as broad, well rounded apically. Fore and middle femora of male only moderately tumid; hind femora testaceous or ferrugineo-testaceous, more or less confusedly bifasciate with blackish fuscous, the entire geniculation blackish fuscous, the inner half of under surface and lower half of inner surface pale sanguineous; hind tibiae very dark glaucous, almost purplish, the spines pallid in basal, black in apical half, nine to ten, usually nine, in number in the outer series. Extremity of male abdomen clavate, strongly recurved, the supraanal plate triangular, with subrectangulate apex and feebly and broadly crenate margins, the sharp and low ridges bounding the exceptionally shallow and flat median sulcus forming a broad triangle in somewhat less than the basal half of the plate, though the sulcus continues as a delicate incision and broadens a little at the apex; firecula consisting only of the rectangulate but projecting inner corners of the gradually broadening divided lateral halves of the last dorsal segment; cerci broad at base, gently tumid, rapidly and regularly narrowing in the basal half, beyond subequal, very slender, hardly a fourth as broad as at base, incurved, the tip bluntly pointed, the whole about twice as long as the basal breadth; subgenital plate long and narrow, the lateral and apical margins in nearly the same plane, but feebly elevated apically, as seen from above well rounded, entire.

Length of body, male, 16.5 mm., female, 20.5 mm.; antennae, male, 7.5 mm., female, 8 mm.; tegmina, male and female, 4 mm.; hind femora, male, 10.5 mm., female, 12.75 mm.

Two males, 1 female. Los Angeles, California. Coquillett (U.S.N.M.—Riley collection).

This species differs from the preceding mainly in coloring and in the larger and bulkier female.

64. MELANOPLUS FUSCIPES, new species.

(Plate XVI, fig. 9.)

Pezotettix fuscipes McNEILL!, MS.

Of rather small size, dark ferrugineo-fuscous with black markings. Head feebly prominent, testaceous, heavily flecked or sometimes suffused with fuscous, above dark fuscous mesially, separated by a dull flavo-testaceous stripe bordering the eye from the broad piceous post-ocular band; vertex moderately tumid, elevated somewhat above the

pronotum, the interspace between the eyes hardly (male) or fully (female) half as broad again as the first antennal joint; fastigium not very declivent, distinctly (male) or rather feebly (female) sulcate; frontal costa rather prominent, not reaching the clypeus, subequal but narrowly and feebly contracted above, as broad as the interspace between the eyes, scarcely sulcate below the ocellus, punctate throughout; eyes rather large, rather prominent in the male, not at all in the female, much longer than the infraocular portion of the genae; antennae luteo- or fulvo-testaceous, a little infuscated apically and paler at the base, nearly four fifths (male) or two-thirds (female) as long as the hind femora. Pronotum feebly expanding posteriorly, the disk dark fuscous, a broad dull flavous or cinereous stripe on either side, limited exteriorly by the lateral carinae and generally fading or obsolete on the metazona, leaving between them a mesial fuscous stripe no broader than they, the lateral lobes flavo-testaceous below with a postocular piceous band, very broad and sometimes percurrent, but then broadened and diffused or embrowned on the metazona; disk very broadly convex, passing almost insensibly into the subvertical lateral lobes; median carina distinct and sharp on the metazona, almost wholly wanting on the prozona; front margin truncate, hind margin very broadly rounded or subtruncate, occasionally subangulate; prozona sparsely punctate, varying from quadrate to distinctly longitudinal, the latter only in the male, a third to a half longer than the finely punctate metazona. Prosternal spine short, stout, conical, shorter and stouter in the female than in the male; interspace between mesosternal lobes twice or more than twice as long as broad with parallel sides (male) or longitudinally subquadrate (female). Tegmina abbreviate, shorter than the pronotum, rotundato-ovate, from a fourth to a half as long again as broad, well rounded apically, approximate or subattingent, rarely attingent, brownish fuscous sometimes streaked with cinereous. Fore and middle femora of male considerably tumid; hind femora moderately slender, flavo-testaceous, distinctly and rather narrowly bifasciate with blackish fuscous, the geniculation blackish fuscous, the inferior face flavous sometimes infuscated; hind tibiae pale fusco-glaucous, the spines pallid on basal, black on apical half, nine to eleven, usually eleven, in number in the outer series. Extremity of male abdomen clavate, very strongly recurved, the supraanal plate triangular with acutangulate apex, nearly plane, with a pair of lateral arcuate blunt incurved ridges, formed of a plication beginning with the basal half of the lateral margins but ending abruptly before the median line, the median sulcus very slight and slender, percurrent; furcula entirely wanting; cerci broad and slightly tumid at base, rapidly and regularly tapering in the proximal half, beyond much less rapidly, the distal half forming a compressed, subequal, slender, incurved ribbon, hardly more than a third as broad as the base, the tip rounded but slightly angulate below, the whole about twice as long as the basal breadth, suberect; subgenital plate bluntly

conical, about as long as broad, ending in a slight postmarginal tubercle, the margins in one plane, broadly rounded, entire.

Length of body, male, 15 mm., female, 20.5 mm.; antennae, male, 6.75 mm., female, 7.5 mm.; tegmina, male, 3.5 mm., female, 4 mm.; hind femora, male, 9 mm., female, 11.25 mm.

Six males, 4 females. California (U.S.N.M.—Riley collection); San Bernardino County, California, May (same); Los Angeles, California, Coquillett (same); San Diego County, May (U.S.N.M.); between San Luis Obispo and San Simeon Bay, California, E. Palmer.

This species is very close indeed to the preceding, but differs from it in lacking the lateral carinae of the pronotum and the angulations representing the furecula, in the possession of an apical tubercle to the supraanal plate, and in the heavier flavous stripe of the disk of the pronotum.

The name, apparently chosen from the color of the hind tibiae, is not very closely descriptive of them.

65. MELANOPLUS SCITULUS, new species.

(Plate XVI, fig. 10.)

Of small size, brownish fuscous. Head not prominent, olivaceo-fuscous, above much infuscated, with a broad piceous postocular band; vertex very gently tumid, feebly elevated above the pronotum, the interspace between the eyes scarcely broader than (male) or nearly twice as broad as (female) the first antennal joint; fastigium moderately declivent, feebly sulcate; frontal costa almost or quite percurrent, equal, about as broad as (male) or slightly narrower than (female) the interspace between the eyes, feebly sulcate at and below the ocellus (male), or distinctly sulcate almost throughout (female), feebly punctate; eyes rather large, only moderately prominent even in the male, considerably longer than the infraocular portion of the genae; antennae luteo-testaceous, slightly infuscated apically, about three-fifths (male) or but little more than one-half (female) as long as the hind femora. Pronotum very gently enlarging from in front backward, varying from testaceous-fuscous to blackish fuscous, always with more or less ferruginous, luteo-testaceous on the lower half of the lateral lobes, with a broad, piceous, postocular band either confined to the prozona or extending obscurely and more widely upon the metazona, the disk broadly convex, passing by an abruptly rounded shoulder into the inferiorly vertical lateral lobes; median carina equally distinct and sharp throughout; front margin truncate, hind margin very broadly rounded, subtruncate; prozona sparsely and shallowly punctate, distinctly longitudinal, much more than half as long again as the sharply and closely punctate metazona. Prosternal spine appressed subconical, not very long, transversely and broadly rounded apically; interspace between mesosternal lobes slightly longer than broad (male) or transverse, but much narrower than the lobes (female). Tegmina abbreviate, somewhat shorter

than the pronotum, attingent, rotundato-ovate, less than half as long again as broad, apically rounded, brownish fuscous. Fore and middle femora somewhat rounded in the male; hind femora ferrugineo fuscous or flavo-fuscous, darkest along the upper half of the outer face, without fasciation, the under and inner faces flavous or pale sanguineous, the genicular arc blackish; hind tibiae dark glaucous, the spines pallid in basal, black in apical half, nine to eleven, usually ten, in number in the outer series. Extremity of male abdomen clavate, considerably recurved, the supraanal plate hastate with rectangulate apex, the surface nearly plane, the median sulcus shallow, narrow, and narrowing, inclosed between low rounded walls, which unite near the middle of the plate; furcula reduced to two slight, approximate, blunt denticulations, overlying the base of the just-mentioned ridges; cerci broad at base, tapering rapidly and subequally so as to form long triangular plates, faintly incurved, apically faintly decurved and finely acuminate at tip, the lower margin faintly concave; subgenital plate small, not much longer than broad, very broadly and bluntly subconical, the cone forming a feeble and blunt apical tubercle, the lateral and apical margins on the same plane, well rounded, entire.

Length of body, male, 14.5 mm., female, 18 mm.; antennae, male, 5.6 mm., female, 5.5 mm.; tegmina, male and female, 3.25 mm.; hind femora, male, 9.1 mm., female, 10 mm.

Two males, 1 female. Mount Alvarez, San Luis Potosi, Mexico, E. Palmer.

This species is the most aberrant of its series.

15. PUER SERIES.

In the species of this small group, the prozona of the male (and generally of the female) is longitudinal and nearly twice as long as the metazona, with its truncate or feebly produced hind margin; the median carina is similar throughout. The interspace between the mesosternal lobes in the same sex is slightly or much longer than broad. The male antennae are long and considerably longer proportionately than those of the female. The tegmina are abbreviate, of about the length of the pronotum, obovate and apically rounded. The hind tibiae are prevailingly glaucous, the spines ten to eleven, rarely nine, in number in the outer series.

The supraanal plate of the male is triangular or hastate, the surface subtectate with a deep median sulcus; the furcula is variable in length, either reduced to mere denticulations or developed as parallel spines nearly a third as long as the supraanal plate; the cerci are small and styliform with slight concavity of the upper margin, acuminate and much shorter than the supraanal plate; the subgenital plate varies considerably but is rather full, and the apical margin entire.

Two species are known, one very small from Florida, the other rather large from Texas, and they are brought together in one group principally from their simple styliform cerci.

66. MELANOPLUS FLABELLATUS.

(Plate XVII, fig. 1.)

Pezotettix flabellatus SCUDDER¹. Proc. Bost. Soc. Nat. Hist., XX (1879), pp. 82-83; Cent. Orth. (1879), pp. 71-72.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.

Somewhat above the medium size. Head not prominent; vertex feebly tumid, barely elevated above the pronotum, the interspace between the eyes slightly broader than (male) or fully half as broad again as (female) the first antennal joint; fastigium rather steeply declivent, shallow, broad, subspatulate, with distinct but low and coarse bounding walls; frontal costa broad, equal, rather broader than (male) or as broad as (female) the interspace between the eyes, flat throughout or faintly sulcate down the middle below the ocellus, biserially punctate above; eyes moderately large, moderately prominent, a little longer than the infraocular portion of the genae; antennae nearly four-fifths (male) or four-sevenths (female) as long as the hind femora. Pronotum very simple, enlarging backward uniformly but slightly, and less so in the male than in the female; front margin truncate, hind margin gently angulato-arcuate; median carina distinct, slight, equal, percurrent; lateral carinae scarcely indicated and on the metazona wholly obsolete; whole disk gently punctate, the prozona more sparsely than the metazona; prozona distinctly longitudinal (male) or quadrate or feebly longitudinal (female), fully (male) or about (female) half as long again as the metazona. Prosternal spine moderately long, appressed conical, blunt, erect; interspace between mesosternal lobes fully half as long again as broad (male) or transverse but shorter than the lobes (female). Tegmina abbreviate, a little shorter than the pronotum, rounded ovate, half as long again as broad, the apex not at all produced, slightly overlapping at their inner margins. Extremity of male abdomen a little clavate, somewhat recurved, the supraanal plate triangular, of about equal length and breadth, the apex bluntly pointed, the sides very nearly straight, with a slight transverse median ridge not reaching the sides; furcula formed of two rather distant, nearly straight, subconical processes, scarcely reaching the transverse ridge; cerci simple, conical, scarcely curved, tapering more on the basal than the apical half, about half as long as the supraanal plate; subgenital plate broader than long, the lateral and apical margins on the same plane, well rounded or feebly angulate apically, entire, the lateral margins incurved basally.

The general color above is either a very pale brownish yellow or a brownish griseous; below dirty yellow with a greenish tinge; antennae fulvous, lutescent basally, darker apically; a broad blackish fuliginous belt runs from behind the eye across the lateral lobes of the pronotum, generally broadening slightly and fading a little on the metazona. The pleura are marked as in *M. texanus* and the tegmina are unicolorous and of the color of the disk of the pronotum. The hind femora partake of

the color of the upper surface of the body and have faint fuscous indications of bifasciation above; hind tibiae glaucous, but at the base yellowish with a glaucous or fusco-glaucous annulation; spines black with a pallid base, usually eleven in number in the outer series. The upper surface and sides of the abdomen are uniform in tint, the sides unmarked by any black band.

Length of body, male, 19 mm., female, 27 mm.; antennae, male, 7.75 mm., female, 8 mm.; tegmina, male, 5 mm., female, 6 mm.; hind femora, male, 10.25 mm., female, 14 mm.

Ten males, 21 females. Texas, Belfrage (U.S.N.M.—Riley collection); Dallas, Texas, Boll (same; S. H. Scudder).

In general appearance and in most points of its structure this species resembles *M. discolor*. It may at once be distinguished from it by the shape of the tegmina and the male cerci and by the color of the hind tibiae.

67. MELANOPLUS PUER.

(Plate XVII, fig. 2.)

Pezotettix puer SCUDDER! (pars), Proc. Bost. Soc. Nat. Hist., XIX (1877), p. 87; (pars), Entom. Notes, VI (1878), p. 28.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.

Brownish fuscous with a ferruginous tinge. Head feebly prominent, yellowish brown, heavily mottled with dusky brown in small spots, often deepening (especially above) to blackish brown; vertex feebly tumid, elevated but slightly above the pronotum, the interspace between the eyes narrow, not (male) or scarcely (female) broader than the first antennal joint; fastigium very steeply declivent, deeply sulcate throughout; frontal costa narrow, scarcely wider than the interspace between the eyes, equal, percurrent, sulcate at and below the ocellus; eyes large and prominent, in the male as high as the vertex, much larger than the infraocular portion of the genae; antennae castaneous, gradually infuscated apically, nearly three-fourths (male) or nearly two-thirds (female) as long as the hind femora. Pronotum brownish yellow, more or less infuscated above, regularly expanding posteriorly, very slightly in the male, noticeably in the female, the disk feebly convex transversely and passing by a tolerably distinct but smoothed angle into the vertical lateral lobes, which in the male are marked with an exceptionally large piceous spot on the upper portion of the prozona, especially on the anterior section—a mark which is only indicated in the female in dull fuscous and is much broken or subobsolete; median carina equally distinct throughout; front and hind margins truncate, the latter distinctly emarginate in the middle; prozona longitudinal, nearly twice as long as the more finely punctate metazona. Prosternal spine rather short, erect, lobate, very strongly appressed, well rounded, the posterior face flat; interspace between mesosternal lobes slightly longer than broad (male) or quadrate (female), the metasternal lobes subattingent (male) or approximate (female). Teg

mina brownish fuscous, minutely flecked with fuscous in the interstices of the crowded veins, obovate, well rounded, twice as long as broad, lateral, widely separated, hardly longer than the prozona. Legs variable in color but generally dull yellowish brown, the hind femora generally bifasciate with fuscous above besides the black geniculation; hind tibiae at base and at tip dull yellow mottled with brown, the rest purplish glaucous, the spines black beyond the base, nine to ten, usually ten, in number in the outer series. Extremity of male abdomen hardly clavate, not at all recurved, the supraanal plate triangular with slightly convex sides and acutangulate apex, tectate but with elevated lateral margins forming large lateral sulci, the median sulcus deep, tapering, crossing the basal half of the plate; furcula consisting of a pair of minute pointed projections overlying the submedian ridges of the supraanal plate; cerci slight, styliform, slender beyond the thickened base, then scarcely tapering, gently incurved, the tip bluntly pointed; subgenital plate small, subconical, of equal breadth, somewhat longer than the apical breadth, with a slight erect tubercle.

Length of body, male, 10.5 mm., female, 16 mm.; antennae, male, 5.5 mm., female, 7 mm.; tegmina, male, 2.2 mm., female, 2.5 mm.; hind femora, male, 8 mm., female, 10 mm.

One male, 4 females. Fort Reed, Orange County, Florida, April 8-10, J. H. Comstock; Jacksonville, Duval County, Florida, November, Maynard (S. Henshaw).

This is the smallest known species of *Melanoplus*.

16. INORNATUS SERIES.

The prozona of the male is here distinctly longitudinal, and the interspace between the mesosternal lobes in the same sex quadrate, or feebly longitudinal. The hind margin of the pronotum is either truncate or very broadly obtusangulate. The tegmina are abbreviate and nearly as long as if not somewhat longer than the pronotum, sometimes rounded and sometimes subacuminate apically. The hind tibiae are generally green, and the species vary much in the number of spines in the outer series, ranging from nine to fifteen.

The supraanal plate is triangular and generally rather flat, the lateral margins hardly elevated; the furcula may be either reduced to slight prominences or produced as delicate spines crossing the basal fourth of the supraanal plate; the cerci again vary considerably, being either stout, strongly constricted in the middle and widely expanded apically, or tapering to a half or two-thirds the basal breadth and then forming a relatively slender, slightly decurved, compressed finger; the subgenital plate is narrower, generally considerably narrower, than long, with angulate, slightly elevated and tuberculate extremity.

The species are rather slender, of about medium size, and are three in number. One occurs in Mexico, a second in North Carolina, and the third in Illinois and Indiana.

68. MELANOPLUS INORNATUS, new species.

(Plate XVII, fig. 3.)

Pezotettix inornatus McNEILL, MS.

A little above medium size, ferrugineo-testaceous. Head not prominent, ferrugineo-testaceous, a little darker above, with a broad piceous postocular band; vertex somewhat tumid, slightly elevated above the pronotum, the interspace between the eyes as broad as (male) or fully half as broad again as (female) the first antennal joint; fastigium steeply declivent, faintly and broadly sulcate; frontal costa nearly percurrent, equal, as broad as the interspace between the eyes, feebly sulcate at and below the ocellus, punctate throughout; eyes moderately large, slightly prominent in the male, only a little longer than the infraocular portion of the genae; antennae testaceous, a little infuscated apically, about three-fourths (male) or five-sevenths (female) as long as the hind femora. Pronotum subequal but feebly expanding posteriorly, the sides with a broad, piceous, postocular band confined to the prozona, the disk broadly subtectate and gently convex, passing by a tolerably abrupt shoulder, forming tolerably distinct lateral carinae at least on the posterior part of the prozona, into the anteriorly tumid subvertical lateral lobes; median carina tolerably distinct and percurrent, sharper on the metazona than on the prozona, and on the latter very feebly arched longitudinally; front margin faintly convex, hind margin very obtusangulate; prozona sparsely and very shallowly punctate and longitudinal (male) or quadrate or longitudinally subquadrate (female), about a third as long again as the closely and not very deeply punctate metazona. Prosternal spine moderate, appressed conical, retrorse, stouter in the female than in the male; interspace between mesosternal lobes somewhat longer than broad with diverging sides (male) or longitudinally subquadrate (female). Tegmina abbreviate, somewhat longer than the pronotum, overlapping, ovate-lanceolate, apically subacuminate, ferrugineo-fuscous. Fore and middle femora only a very little tumid in the male; hind femora rather slender, compressed, testaceous with a ferruginous tinge, growing flavescent inferiorly, the geniculation fuscous; hind tibiae rufo-testaceous, the spines black on the apical half, eleven to twelve in number in the outer series. Extremity of male abdomen clavate, somewhat recurved, the supraanal plate triangular with acutangulate apex, the margins not elevated, a transverse, percurrent, median plica, and a median sulcus which is triangular on the basal half, slender in the apical half, and crosses two-thirds of the plate; furcula consisting of the feebly projecting lobular expansions of the inner extremities of the divided lateral halves of the last dorsal segment; cerci rather large and clepsydral, strongly contracted before the middle, the basal portion tapering but slightly, while the larger apical portion expands greatly, especially above, the rounded tip

thus reaching the extremity of the supraanal plate; subgenital plate small, moderately broad but much narrower than long, the apical portion a little elevated and tumid, subtuberculate.

Length of body, male, 19 mm., female, 29 mm.; antennae, male, 9 mm. (est.), female, 10 mm.; tegmina, male, 7.5 mm., female, 9 mm.; hind femora, male, 11.75 mm., female, 14 mm.

One male, 2 females. Locality unknown (J. McNeill): Montelovez, Coahuila, Mexico, September 20, E. Palmer.

All the specimens seen have been immersed in alcohol, which may have somewhat affected their colors.

69. *MELANOPLUS VIRIDIPES*, new species.

(Plate XVII, fig. 4.)

Pezotettix viridipes WALSH!, MS. (1865).—BLATCHLEY, Can. Ent., XXIII (April, 1891), p. 80; *ibid.*, XXIV (1892), p. 34—undescribed.

Pezotettix viridicrus WALSH!, MS. (1865).

Pezotettix viridulus [by error for *viridicrus*] MCNEILL, Psyche, VI (May, 1891), pp. 75-76.—BLATCHLEY, Can. Ent., XXIV (1892), p. 34; *ibid.*, XXVI (1894), p. 245—undescribed.

Of medium size, brownish fuscous above, flavous beneath; head not prominent, dark olivaceo-testaceous, sometimes plumbeous, above much infuscated, with a broad piceous postocular band; vertex moderately tumid, scarcely elevated above the pronotum, the interspace between the eyes half as broad again (male) or twice as broad (female) as the first antennal joint; fastigium rather steeply declivent, distinctly (male) or shallowly (female) sulcate; frontal costa almost percurrent, slightly narrowed at upper extremity, especially in the male, otherwise equal, about as broad as the interspace between the eyes, sulcate at and below the ocellus, punctate throughout; eyes moderately large, rather prominent, particularly in the male, somewhat longer than the infraocular portion of the genae; antennae testaceous or rufo testaceous, apically infuscated, distinctly longer than (male) or three-fourths as long as (female) the hind femora. Pronotum subequal, faintly expanding posteriorly, above ferrugineo testaceous, sometimes infuscated, on the sides flavous or flavo-testaceous below, but the upper portion wholly occupied by a very broad, percurrent, piceous, postocular band, broadening slightly on the metazona, the disk convex and passing by a slight shoulder into the anteriorly tumid vertical lateral lobes; median carina distinct though rather slight on the metazona and, in the female at least, on the front of the prozona, elsewhere obsolete or subobsolete; front margin faintly convex, and in the male with a scarcely perceptible emargination, hind margin rotundato obtusangulate, almost subtruncate; prozona distinctly (male) or faintly (female) longitudinal, about half as long again as the densely but not deeply punctate metazona. Prosternal spine short and rather stout, conical; interspace

between mesosternal lobes quadrate (male) or very transverse but narrower than the lobes (female). Tegmina abbreviate, generally a little longer than the pronotum, slightly overlapping, elliptical, apically rounded, more than twice as long as broad, brownish fuscous. Fore and middle femora considerably tumid in the male; hind femora moderately slender, flavous, sometimes more or less ferruginous, obliquely bifasciate with brownish or blackish fuscous, with a large blackish genicular patch; hind tibiae pale green or glaucous, pallid or pale flavous at the base, with a dusky patellar spot, the spines black in more than the apical half, nine to ten in number in the outer series. Extremity of male abdomen clavate, much recurved, the supraanal plate triangular with acutangulate apex, rather flat, the median sulcus broad, equal, shallow and percurrent, lying between low ridges which, as well as the sulcus, are interrupted mesially; furecula consisting of a pair of small, distant, triangular denticulations; cerci long and rather slender, erect and gently incurved, tapering gradually from base to middle, which is about two-thirds as broad as the base, beyond almost equal but feebly enlarged, slightly produced inferiorly at the apex, and the whole apical subequal portion feebly decurved; subgenital plate somewhat longer than broad, subequal, apically elevated slightly and produced to a delicate conical tubercle.

Length of body, male, 16 mm., female, 21.5 mm.; antennae, male, 9.5 mm., female, 9 mm.; tegmina, male, 5 mm., female, 5.25 mm.; hind femora, male, 8.5 mm., female, 11.75 mm.

Twelve males, 13 females. Illinois, Uhler; Rock Island, Illinois, Walsh; Moline, Rock Island County, Illinois, J. McNeill; Ogle County, Illinois, June 20, J. A. Allen; Rivière de Pare, June 14, L. Bruner; Vigo County, Indiana, May 25, June 8, 11, Blatchley (W. S. Blatchley: A. P. Morse). A specimen in the U. S. National Museum from Montana perhaps belongs here.

It has also been reported by McNeill from McLean County, Illinois, and Monroe County, Indiana.

This species is remarkable for the length of the antennae. It matures very early, McNeill having taken it as early as June 5 in Illinois, where he thinks it is the first Orthopteron to mature from eggs of the same season. Blatchley records it in Indiana even as early as May 11. McNeill says "it is by no means common, . . . being restricted to a few localities [about Moline]. It shows a decided preference for the sides of open, grassy ravines." One specimen before me is marked by Blatchley as found in woods.

The species has never before been described, but has been mentioned by Walsh's names in several publications; the specific name "viridulus" used on one or two occasions was a misreading of Walsh's name "viridicus," and probably originally due to bad chirography on my part.

70. *MELANOPLUS DECORUS*, new species.

(Plate XVII, fig. 5.)

Of medium size, very slender and elongate, brownish fuscous with a ferruginous tinge above, flavous beneath. Head not at all prominent, olivaceo-flavous more or less infuscated, above fuscous, with a broad piceous postocular band; vertex hardly at all tumid, not raised above the level of the pronotum, scarcely or not reaching the level of the upper arch of the eyes, the interspace between the eyes very narrow, hardly as broad as the first antennal joint; fastigium steeply declivent, feebly sulcate, oblong obpyriform; frontal costa percurrent, equal, scarcely broader than the interspace between the eyes, feebly sulcate at and below the ocellus, faintly punctate; eyes large, very prominent, nearly twice as long as the infraocular portion of the genae; antennae testaceous at base. Pronotum long, equal, with a scarcely perceptible expansion of the metazona, brownish fuscous above, flavous or flavo-testaceous on the sides, with a rather broad, percurrent, piceous, post-ocular band, narrower on the metazona than on the prozona, the disk considerably convex and passing with only a feeble shoulder into the vertical lateral lobes; median carina distinct, sharp, equal, percurrent; front margin feebly convex with the faintest possible emargination, hind margin subtruncate; prozona very longitudinal, nearly twice as long as the densely and sharply punctate metazona. Prosternal spine moderate, slender, conico-cylindrical, blunt, erect; interspace between mesosternal lobes a little longer than broad. Tegmina abbreviate, shorter than the pronotum, attingent or subattingent, ovate, well rounded apically, less than twice as long as broad, brownish fuscous. Fore and middle femora somewhat tumid in the male; hind femora flavous, sometimes more or less ferruginous, the whole geniculation except the apical portion of the lower lobe black; hind tibiae pale greenish or pale glaucous, the spines black to their base, fourteen to fifteen in number in the outer series. Extremity of male abdomen considerably clavate, recurved, the supraanal plate clypeate with rectangulate tip, raised and sinuate lateral margins, a narrow, deep, percurrent, median sulcus, the walls of which are hardly elevated into ridges, and an apical pair of short, convergent, blunt ridges; furcula consisting of a pair of basally attingent, divergent, slender, tapering, acuminate fingers, crossing rather more than a fourth of the supraanal plate; cerci composed of a moderately broad, rapidly tapering, slightly tumid, basal portion, about one-third of the whole, and a very slender, subequal, gently arcuate, incurved, and apically faintly expanding portion, hardly more than a third as broad as the base, inferiorly angulate at tip and reaching about to the tip of the supraanal plate; subgenital plate small, greatly tapering, so as to be very narrow at tip, the apical margin considerably elevated to form a delicate tubercle.

Length of body, male, 17.5 mm.; tegmina, 4 mm.; hind femora, 9.5 mm. Two males. Dingo Bluff, North Carolina, November 15, Parker-Maynard.

In general appearance this insect has a strong resemblance to *M. attenuatus* from the same region.

17. FASCIATUS SERIES.

This group is not very homogeneous, comprising forms of considerable difference in appearance and structure, but which have a number of important points in common. It is composed in part of brachypterous and in part of macropterous forms. One species is dimorphic in this respect, and the others, whether macropterous (one only) or brachypterous (six in number), are exceptionally short-winged or exceptionally long-winged for their type. The antennae are very variable in length, being sometimes quite similar, sometimes quite dissimilar, in the two sexes and varying in the male from three-fifths as long as the hind femora to equal their length, and in the female from one-half to four-fifths the length of the hind femora. In size they range from very small to a little above the medium.

The prozona of the male varies from quadrate to longitudinal in both brachypterous and macropterous forms. The interspace between the mesosternal lobes in the same sex is also very variable in each set of forms, and in both together ranges from a little transverse to twice as long as broad. The tegmina in the brachypterous forms are usually comparable with the length of the pronotum and are well rounded, but in the dimorphic form they are apically subacuminate and twice as long as the pronotum (as in one of the brachypterous forms) or far surpass the hind femora and are broad and well rounded apically; while in the single macropterous form they barely reach the tip of the hind femora. The hind tibiae are likewise very variable in color, sometimes within the species, and have from nine to twelve, usually eleven, spines in the outer series.

The supraanal plate is generally rather long triangular, and rather flat, with but feebly elevated margins, except in one instance, where it is strongly compressed apically. The furcula is usually very feebly developed, but three species have slender fingers extending some distance over the supraanal plate. The cerci are rather large, compressed, generally incurved laminae, generally of considerable breadth, but in one instance exceptionally slender, generally more or less constricted mesially, in two species greatly, and, with a single exception, enlarged again apically, rounded and not acuminate (in one species emarginate) at tip. The subgenital plate again varies much, but is always longer than broad, generally moderately broad and nearly equal and usually a little elevated apically, the apical margin always entire.

The eight species have as little geographical as structural relation. One is known only from the extreme north in Labrador and Greenland:

two from Florida only; another only from Oregon and Washington; a fifth from Kentucky; a sixth from North Carolina; a seventh from Indiana, Texas, and, perhaps, Carolina; while the eighth occurs across the continent from Newfoundland and New Jersey in the east to Washington in the west, and from the Saskatchewan to Colorado.

The most aberrant member of the series is *M. borealis*. None of them are likely to be confounded.

71. MELANOPLUS ATTENUATUS, new species.

(Plate XVII. fig. 6.)

Of medium size and very slender, light ferrugineo-fuscous. Head rather prominent, flavo-testaceous, fuscous above, with a broad piceous postocular band; vertex moderately tumid, a little elevated above the pronotum, the interspace between the eyes about as broad as the first antennal joint; fastigium steeply declivent, distinctly but not deeply sulcate; frontal costa percurrent, subequal, faintly narrower above, slightly broader than the interspace between the eyes, faintly depressed at the ocellus, punctate throughout, biserially above; eyes large, very prominent, nearly twice as long as the infraocular portion of the genae; antennae fusco-testaceous, fully four-fifths as long as the hind femora. Pronotum subequal, faintly expanding on the metazona, ferrugineo-testaceous more or less infuscated above, flavous or fusco-flavous on the sides, with a broad, piceous, postocular band confined to the prozona, the disk gently convex, passing by a rather broadly rounded shoulder into the anteriorly tumid vertical lateral lobes; median carina distinct, percurrent, equal; front margin feebly convex, hind margin subtruncate; prozona very longitudinal, nearly twice as long as the sharply and densely punctate metazona. Prosternal spine rather long, feebly conical, very blunt, erect; interspace between mesosternal lobes somewhat longer than broad. Tegmina abbreviate, a little shorter than the pronotum, attingent or subattingent, elliptical, broadly rounded apically, a little less than twice as long as broad, fusco-testaceous. Fore and middle femora somewhat tumid in the male; hind femora slender, light ferruginous, dull flavous beneath, the genicular arc and a basal bar on the lower genicular lobes blackish fuscous; hind tibiae very pale green apically, pale ferrugineo-flavous basally, the spines black nearly to their base, twelve to fourteen in number in the outer series. Extremity of male abdomen clavate, considerably recurved, the supraanal plate long triangular, a little and narrowly compressed just beyond the base, the tip acutangulate but well rounded, the lateral margins somewhat elevated, the median sulcus lying between sharp but not high walls in the basal two-thirds of the plate, beyond which are a pair of more distant, short, subparallel, blunt, longitudinal ridges; furcula consisting of a pair of very slender, tapering and acuminate, divergent fingers, crossing scarcely the basal fourth of the supraanal plate; cerci very slender and

elongate, apically strongly incurved fingers, tapering uniformly to the middle so as to be there less than half as broad as at base, then slightly enlarging to form an apical rounded lobe a little more than half as broad as the base, expanding below more than above, the apical margin rounded but sometimes feebly emarginate so as to appear faintly bifid; subgenital plate rather small and very narrow, narrowing apically, the apical margin well rounded, faintly and broadly tuberculate.

Length of body, male, 19.5 mm.; antennae, 9.5 mm.; tegmina, 4.25 mm.; hind femora, 11 mm.

Three males. Smithville, Brunswick County, North Carolina, November 22, Maynard.

This can not be the *Pezotettix longicornis* of Saussure, described from Carolina, from its lack of distinct lateral carinae and its convex pronotal disk.

72. MELANOPLUS AMPLECTENS, new species.

(Plate XVII, fig. 7.)

A little above medium size, luteo-testaceous. Head a little prominent, luteo testaceous, above very broadly and feebly striped with fuscous, with a broad, piceous, postocular band; vertex somewhat tumid, somewhat elevated above the pronotum, the interspace between the eyes about half as broad again as the first antennal joint; fastigium steeply declivent, angularly sulcate throughout; frontal costa fading just before the clypeus, subequal, slightly broader than the interspace between the eyes, feebly sulcate at and below the ocellus, sparsely and finely punctate throughout; eyes large, very prominent, considerably longer than the infraocular portion of the genae; antennae luteous, a little infuscated apically, fully five-sixths as long as the hind femora. Pronotum subequal, the sides of the prozona with a broad fuscous postocular band, the disk broadly convex, passing by an abrupt rounded shoulder into the anteriorly feebly tumid, vertical, lateral lobes; median carina distinct and sharp on the metazona, feeble but tolerably sharp and equal on the prozona; front margin faintly convex and faintly and narrowly emarginate, narrowly flaring feebly, hind margin broadly obtusangulate; prozona distinctly longitudinal, more than half as long again as the sharply but not very closely punctate metazona. Prosternal spine rather long, conical, a little retrorse, the hinder face straight; interspace between mesosternal lobes nearly half as long again as broad. Tegmina abbreviate, but reaching nearly to the middle of the hind femora, slender lanceolate, the tip very bluntly subacuminate, brownish fuscous deepening above to blackish on the lateral face, cinereous on the dorsal face. Fore and middle femora somewhat tumid in the male; hind femora luteo-testaceous, broadly and almost completely bifasciate with blackish fuscous, which is angularly disposed on the outer face, the whole geniculation blackish fuscous, the inferior face luteous; hind tibiae luteo-flavous, infuscated at base, the spines black almost or quite to their very base, twelve to

fourteen in number in the outer series. Extremity of male abdomen clavate, considerably recurved, the supraanal plate long triangular, a little narrowed at the tip, with an acutangulate apex, the lateral margins elevated to the same height as the sharp and high parallel ridges bounding the median sulcus, which unite just beyond the middle of the plate, and are crossed at the middle by a straight transverse ruga which does not reach the margins; furcula consisting of a pair of minute black denticulations overlying the submedian ridges of the supraanal plate; cerci broad at base, rapidly narrowing to the middle, mainly by the excision of the inferior margin, beyond again expanding as rapidly and nearly as much, and at the same time curved abruptly inward, the apical flange broadly rounded at tip, compressed, and at extreme apex curved abruptly backward; subgenital plate moderately broad, the apical margin broadly and considerably elevated, entire.

Length of body, male, 19.5 mm.; antennae, 10.5 mm.; tegmina, 7.5 mm.; hind femora, 12.5 mm.

One male. Bee Spring, Edmonson County, Kentucky. June 14-15, F. G. Sanborn (Museum Comparative Zoology).

The specimen was formerly in alcohol, which has probably somewhat affected the colors. The clasping form of the cerci has suggested the specific name.

73. MELANOPLUS SALTATOR, new species.

(Plate XVII, fig. 8.)

Pezotettix borekii SCUDDER!, Rep. U. S. Ent. Comm., II (1881), App., p. 24, pl. XVII, fig. 17.—BRUNER!, Bull. Div. Ent. U. S. Dep. Agric., IV (1884), p. 58; Can. Ent., XVII (1885), p. 12.

Ferrugineo-fuscous. Head not prominent, almost wholly fuscous above, the face and genae luteo-testaceous, punctate and more or less marmorate with fuscous; vertex slightly tumid, feebly elevated above the pronotum, the interspace between the eyes broad, two (male) or three (female) times as broad as the basal antennal joint; fastigium considerably declivent, its lateral margins feebly (female) or considerably (male) elevated, but not otherwise sulcate; frontal costa subequal but feebly enlarging from above downward, slightly narrower than the interspace between the eyes, feebly sulcate (if at all) only at and below the ocellus, punctate; eyes moderate in size, not prominent, about as long as the infraocular portion of the genae; antennae ferruginous, often a little infuscated apically, fully two-thirds as long as the hind femora in both sexes. Pronotum subequal, feebly enlarging posteriorly at least in the female, the disk transversely convex and passing almost insensibly into the subvertical lateral lobes, the lower part of the latter of a little lighter color, and the upper part crossed on the prozona by a broad piceous yet often obscure band, which occasionally in the female passes, broadened and diffused, upon the metazona; median carina slight but distinct throughout, feebler on the prozona than on the metazona; front margin truncate or subtruncate, hind margin rotundato-obtusangulate; prozona

quadrate or subquadrate, slightly longer than the closely punctate metazona, the sulcus between them very broadly obtusangulate by wide emargination of the prozona. Prosternal spine long, subcylindrical, blunt, erect; interspace between mesosternal lobes twice as long as broad (male) or a little transverse, narrower than the lobes (female), the metasternal lobes subattinent (male) or tolerably distant (female). Tegmina slightly overlapping (male) or attinent (female), ovate, rather broad, shorter than the pronotum, uniform brownish fuscous. Femora rufescent or fusco-luteous, the fore pair and to some extent the middle pair tumescent in the male, the hind pair more or less but obscurely infuscated in premedian and postmedian bands, which are angulate on the outer face and generally more or less confused; their lower face, especially exteriorly, more or less ferruginous, the geniculation mostly fuscous; hind tibiae generally dull red, more or less feebly flecked or obscured basally with fuscous, sometimes plumbeo-glaucous, the spines rather short and black throughout, eleven to twelve, usually eleven, in number in the outer series. Extremity of male abdomen strongly clavate, much recurved, the supraanal plate abruptly and obliquely contracted laterally in the apical half so as to make the shape somewhat clypeate, the lateral margins raised only in the apical half and here forming between them a dorsal channel which nearly continues, but is a little wider than, the basal median sulcus, which is rather deeply impressed but between walls which rise but little above the otherwise nearly plane surface; furcula consisting of a pair of minute, sometimes scarcely perceptible, distant denticulations on the outer side of the submedian ridges of the supraanal plate; cerci large and stout, elongated, compressed laminae, mesially narrowed so that the apical portion is subspatulate though not so broad as the base, gently incurved, the tip rounded but distinctly produced inferiorly, reaching the tip of the supraanal plate; subgenital plate moderately broad, a little longer than broad, the lateral and apical margins slightly flaring, the latter elevated, well rounded and entire.

Length of body, male, 20 mm., female, 25.5 mm.; antennae, male, 8.5 mm., female, 10 mm.; tegmina, male, 5 mm., female, 5.75 mm.; hind femora, male, 12 mm., female, 13.75 mm.

Ten males, 14 females. Portland, Multnomah County, Oregon, Packard (U.S.N.M.—Riley collection; S. H. Scudder); Oregon City, Clackamas County, Oregon, July, W. G. W. Harford; Soda Springs, Yakima County, Washington, Wickham (L. Bruner); Loon Lake, Colville Valley, Washington, July 23, S. Henshaw (Museum Comparative Zoology).

It is stated by Bruner that this species is "to be met with in the mountains of Montana, Idaho, and Wyoming," and it "appears to abound only where two or three particular plants are met with, one of which is a species of geranium."

The female of this species closely resembles the same sex of *M. borekii*, but has relatively longer antennae, about as long as those of the male, and the tegmina are shorter and more strongly rounded at tip.

74. MELANOPLUS ROTUNDIPENNIS.

(Plate XVII. fig. 9.)

Pezotettix rotundipennis SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1877), pp. 86-87; Ent. Notes, VI (1878), pp. 27-28.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.

Head flavo-testaceous, the summit deeply infuscated, the whole more or less mottled with small fuscous spots; antennae dull brownish red, apically infuscated, at base paler, four-fifths as long as the hind femora. Pronotum above brownish fuscous mottled slightly with dusky yellow, the median carina black; lateral lobes brownish yellow below, above occupied by a broad piceous stripe, running from the eyes nearly to the middle of the abdomen, broader and with vague boundaries on the abdomen and partially interrupted by a slender, oblique, brownish yellow stripe on the crest of the metathoracic episterna. Tegmina but little longer than broad, hardly longer than the prozona, rotund, ovate, black concealed by profuse rufous veins. Legs dull yellowish brown, the middle and hind femora heavily spotted with black, the hind tibiae dull fusco-glaucous, pale at base, the spines black beyond the pallid base, twelve in number in the outer series.

Head not prominent; vertex slightly tumid, a little elevated above the pronotum, the interspace between the eyes scarcely so broad as the basal joint of the antennae; fastigium steeply declivent, shallowly and broadly sulcate in advance of the eyes; frontal costa moderately broad, as broad as the interspace between the eyes, shallowly sulcate throughout, slightly and regularly expanding below, obsolescent next the clypeus; eyes large and prominent, nearly twice as long as the infraocular portion of the genae. Pronotum broadening slightly and regularly throughout, the prozona distinctly longitudinal, almost twice as long as the metazona, its surface very faintly and very sparsely punctate, the median carina sharp but slight and equal; metazona with the median carina not sharp but rather inconspicuous, the surface of the lobe both above and on the sides delicately rugulose; lateral carinae wholly obsolete, the nearly plane disk passing by a well rounded angle into the lateral lobes; both front and hind margins subtruncate, the latter minutely emarginate in the middle. Prosternal spine not very long, appressed cylindrical, very blunt, a little retrorse; interspace between mesosternal lobes about twice as long as broad. Extremity of male abdomen tumid, strongly upcurved; supraanal plate triangular with subrectangulate apex, the sides gently convex, gently upturned, the median sulcus extremely broad, short and shallow; furcula consisting of the slightly produced inner angulation of the widely parted and diverging halves of the last dorsal segment; cerci rather stout but laminate, tapering at the very base, beyond nearly equal, moderately broad, directed inward and backward and bent obliquely a little down-

ward, at the tip slightly expanded, well rounded and scarcely thickened; subgenital plate very small, subpyramidal, a little longer than broad, of subequal breadth, the apical margin slightly elevated and a little full, entire.

Length of body male, 15.5 mm.; antennae, 8 mm.; tegmina, 3 mm.; hind femora, 10 mm.

One male. Jacksonville, Duval County, Florida, May 6, J. H. Comstock.

75. MELANOPLUS CBOVATIPENNIS.

(Plate XVII, fig. 10.)

? *Pezotettix longicornis* SAUSSURE, Rev. Mag. Zool., 1861 (1861), p. 159; Orth. Nov. Amer., II (1861), p. 9.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 150.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.

? *Podisma longicornis* WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 718.

Pezotettix rotundipennis BLATCHLEY!, Can. Ent., XXIII (1891), p. 80.

Pezotettix obovatipennis BLATCHLEY!, Can. Ent., XXVII (1894), pp. 241-243.

Brownish fuscous, with a ferruginous tinge. Head prominent, particularly in the male, varying from plumbeo-olivaceous to ferrugineo-testaceous, often much flecked with fuscous, and above almost wholly fusco-ferruginous or fuscous; vertex rather tumid, elevated a little above the pronotum, the interspace between the eyes rather broad, nearly twice (male) or more than twice (female) as broad as the first antennal joint: fastigium steeply declivent, plane (female) or broadly and shallowly sulcate, or at least with feebly raised lateral margins (male); frontal costa equal or subequal, slightly narrower than the interspace between the eyes, percurrent, very feebly (female) or distinctly (male) sulcate at and below the ocellus, punctate; eyes large, prominent at least in the male, much larger than the infraocular position of the genae; antennae luteo-ferruginous, apically infuscated, as long (male) or more than three-fourths as long (female) as the hind femora. Pronotum rather long, faintly (male) or distinctly (female) enlarging posteriorly with much regularity, the disk blackish fuscous (male) or fusco-ferruginous (female), the lateral lobes below pallid¹ (male) or luteo-testaceous (female), and above with a broad piceous band which broadens and becomes feebler on the metazona; disk broadly convex transversely, passing by a distinct though smoothed angle into the subvertical lateral lobes; median carina equally distinct throughout, scarcely blunter on the prozona than on the metazona; front margin truncate, hind margin subtruncate (male) or truncate (female); prozona longitudinal (female) or very longitudinal (male), fully (male) or nearly (female) twice as long as the distinctly and closely punctate metazona. Prosternal spine moderately long, a little appressed conical, blunt, erect; interspace between mesosternal lobes about half as long again as broad (male) or distinctly transverse, only

¹ Ivory white, according to Blatchley, who has seen them in fresh condition.

a little narrower than the lobes themselves (female). Tegmina broad ovate, shorter than the pronotum, well rounded, varying from a little longer than broad to fully half as long again as broad, lateral, never attingent, uniform brownish fuscous. Mesothoracic epimera piceous and conspicuous from the light color of the thoracic episterna, which is that of the lower portion of the lateral lobes. Fore femora of male very feebly tumescent; hind femora ferruginous, more or less cinereous on the outer face and more or less infuscated on apical half, with feeble cloudy indications of bifasciate fuscous or deeper ferruginous markings on the upper face, the under surface luteo-rufous, the geniculation black or blackish; hind tibiae olivaceous, often more or less infuscated, occasionally red, with a subbasal pallid annulus, the spines black beyond the pallid base, nine to twelve in number in the outer series. Extremity of male abdomen a little clavate, well recurved, the supraanal plate long triangular with slightly convex sides, the margins broadly and feebly raised, the median sulcus percurrent but contracted beyond the middle, before rather deep, with sharp but not greatly elevated walls; furcula consisting of a pair of approximate, somewhat diverging, cylindrical, tapering, slender, acuminate fingers, reaching a little more than one-third way across the supraanal plate; cerci rather slender, mesially contracted to nearly half the extreme basal width by the arcuation of the upper margin, the lower border being straight, beyond the middle somewhat enlarged again, the apex roundly truncate, the whole gently incurved, nearly reaching the tip of the supraanal plate; infracercal plate almost as long as the supraanal, apically broad; subgenital plate small, almost as broad as long, the apical margin not elevated, well rounded as viewed from above, entire.

Length of body, male, 16 mm., female, 29 mm.; antennae, male, 10 mm., female, 10.25 mm.; tegmina, male, 3.5 mm., female, 4.25 mm.; hind femora, male, 10 mm., female, 13.25 mm.

Twelve males, 14 females. Vigo County, Indiana, W. S. Blatchley (A. P. Morse; S. H. Scudder); High Bridge, Jessamine County, Kentucky, October 15, H. Garman; near Mammoth Cave, Kentucky, October 2, Putnam (Museum Comparative Zoology); St. Louis, Missouri (U.S.N.M.—Riley collection); Dallas, Texas (U.S.N.M.—Riley collection); L. Bruner).

Blatchley also reports it from Monroe County, Indiana, and if Sausure's species is the same it is also found in Carolina. Blatchley says "it reaches maturity about September 1, and frequents for the most part high, dry, open woods, especially those in which beech and oak trees predominate . . . In late October, if the season is dry, it is often found . . . among the reeds and tall rank grasses near the border of marshes."

76. MELANOPLUS JUVENCUS. New species.

(Plate XVIII, fig. 1.)

Pezotettix pur SCUDDER! (pars), Proc. Bost. Soc. Nat. Hist., XIX (1877), p. 87;
(pars), Ent. Notes, VI (1878), p. 28.

Brownish fuscous with a ferruginous tinge. Head not prominent, luteo-testaceous with an olivaceous tinge, flecked feebly with fuscous, above deeply infuscated; vertex feebly tumid, scarcely raised above the level of the pronotum, the interspace between the eyes no wider than the first antennal joint: fastigium steeply declivent, sulcate throughout; frontal costa narrow, no wider than the interspace between the eyes, equal, percurrent, distinctly sulcate excepting above, punctate; eyes large, prominent, much longer than the infraocular portion of the genae; antennae dull luteous at base, growing rufescent beyond, apically infuscated, about three-fifths as long as the hind femora. Pronotum subequal, the disk nearly plane but very broadly tectate, passing by an abrupt angle, forming a distinct lateral carina, into the slightly tumid, subvertical lateral lobes, which are marked above on the prozona by an exceptionally broad piceous belt, broader on the anterior than on the posterior section; median carina equally distinct throughout; front and hind margins truncate, the latter feebly emarginate in the middle; prozona longitudinal, very sparsely punctate, almost twice as long as the finely but obscurely ruguloso-punctate metazona. Prosternal spine short, lobate, appressed, very blunt, suberect; interspace between mesosternal lobes a little longer than broad, the metasternal lobes approximate. Tegmina obovate, well rounded, twice as long as broad, longer than the head and pronotum together, attinent, uniform dark castaneous. Fore femora feebly tumescent; hind femora rufo-luteous, olivaceous on the outer face, rather broadly and transversely bifasciate with fuscous, the whole geniculation blackish; hind tibiae pale, rather dingy greenish, with a lutescent basal annulus the spines black almost or quite to the base, ten in number in the outer series. Extremity of male abdomen slightly clavate, a little upturned, the supraanal plate rather long triangular, the lateral margins slightly elevated, a pair of short, distant, apical ridges, and the median sulcus rather deep and conspicuous between sharp and rather high walls extending beyond the middle of the plate; fureula consisting of a pair of slight denticulations overlying the bases of the submedian ridges of the supraanal plate; cerci long and rather slender, tapering in the basal third only, beyond equal nearly to the tip, which is rounded but unequally curved, forming a blunt angle inferiorly, the whole fully four times as long as the median breadth, yet scarcely surpassing the tip of the supraanal plate, gently incurved apically, the whole lower margin straight; subgenital plate small, considerably longer than broad, broader at base than at apex, the apical margin neither elevated nor prolonged, well rounded but feebly angulate, entire.

Length of body, male, 17 mm.; antennae, 4.75 mm.; tegmina, 4.75 mm.; hind femora, 8 mm.

One male. Fort Reed, Orange County, Florida, April 3, J. H. Comstock.

I carelessly included this in *Pezotettix puer* when originally described, but the description shows that it could not then have been examined carefully, for it differs obviously both in the male cerci and in the tegmina.

77. MELANOPLUS FASCIATUS.

(Plates I, fig. c; XVIII, figs. 2-4.)

Pezotettix borealis SCUDDER!, Can. Nat., VII (1868), p. 286; Bost. Journ. Nat. Hist., VII (1868), p. 464.—SMITH, Proc. Pord. Soc. Nat. Hist., I (1868), p. 149.—PACKARD, Guide Ins. (1869), p. 569.—THOMAS, Proc. Acad. Nat. Sc. Philad., 1870 (1870), p. 78; Ann. Rep. U. S. Geol. Surv. Terr., II (1871), p. 265; Rep. U. S. Geol. Surv. Terr., V. (1873), p. 153.—SCUDDER!, Hitche. Rep. Geol. N. H., I (1874), p. 374; Daws. Geol. Rec. 49th Par. (1875), p. 343.—BRUNER, Can. Ent., IX (1877), p. 144.—THOMAS, Bull. U. S. Geol. Surv. Terr., IV (1878), p. 484.—GIRARD, Traité Élém. d'Ent., II (1879), p. 246.—SCUDDER, Can. Ent., XII (1880), p. 75.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59; Rep. U. S. Ent., 1885 (1886), p. 307.—CAULFIELD, Rep. Ent. Soc. Ont., XVIII (1886), p. 71; Can. Rec. Sc., II (1887), p. 401; Can. Orth. (1887), p. 13.—FERNALD, N. E. Orth. (1888), pp. 29, 30; Ann. Rep. Mass. Agric. C XV (1888), pp. 113, 114.—MORSE, Psyche, VII (1894), pp. 53, 106.

Acridium fasciatum BARNSTON, MS., fide WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 680.

Caloptenus fasciatus WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 680; Can. Ent., IV (1872), p. 30.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 224.—CAULFIELD, Can. Rec. Sc., II (1887), p. 401; Can. Orth. (1887), p. 14.

Melanoplus rectus SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1878), pp. 284, 285; Ent. Notes., VI (1878), pp. 43, 44; Proc. Bost. Soc. Nat. Hist., XX (1879), p. 51; Cent. Orth. (1879), p. 60.—BRUNER, Rep. U. S. Ent. Comm., III (1888), p. 60.—FERNALD, Orth. N. E. (1888), pp. 31, 32; Ann. Rep. Mass. Agric. Coll., XXV (1888), p. 115, 116.—MORSE, Psyche, VII (1894), p. 53.

Melanoplus curtus SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), pp. 70-71; Cent. Orth. (1879), p. 59.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 61; Can. Ent., XVII (1885), p. 17; Publ. Nebr. Acad. Sc., III (1893), p. 28.—MORSE, Psyche, VII (1894), p. 53.

Melanoplus fasciatus CAULFIELD, Rep. Ent. Soc. Ont., XVIII (1886), p. 71.

Melanoplus borealis BEUTENMÜLLER, Bull. Amer. Mus. Nat. Hist., VI (1894), p. 308.

Of rather small size, dark fusco-plumbeous above, dark clay yellow below. Head not prominent, dull plumbeous flecked with griseous, above very dark fuscous with a broad postocular piceous band; vertex moderately tumid, distinctly elevated above the pronotum, the interspace between the eyes as broad (male) or nearly half as broad again (female) as the basal antennal joint; fastigium strongly declivent, shallowly depressed, but with distinct and somewhat abrupt though rounded bounding walls, which diverge a very little in front of the eyes and then converge; frontal costa as broad as the interspace between the eyes, scarcely contracted above where its face is plane (male) or feebly

tumid (female), at and below the ocellus rather narrowly sulcate, deeper in the male than in the female, pereurrent, punctate; eyes rather small, not prominent, longer than the infraocular portion of the genae; antennae ferruginous, growing lutescent toward the base, dusky toward the tip, nearly or quite as long (male) or about two thirds as long (female) as the hind femora. Pronotum subequal, feebly expanding posteriorly especially in the female, the disk plano-convex, separated by a well-rounded but distinct shoulder from the vertical lateral lobes, brownish fuscous, sometimes fuseo-testaceous and then generally punctate with ferruginous, the upper part of the lateral lobes with a broad piceous band crossing the prozona and sometimes continued as a feeble dusky cloud on the metazona; front border truncate, hind border broadly obtusangulate, the angle rounded; median carina distinct only on the metazona and at the front of the prozona, elsewhere obsolete or subobsolete; prozona feebly longitudinal (male) or feebly transverse (female), a very little longer than the minutely rugulose metazona. Prosternal spine short, stout, blunt, conical, erect; interspace between mesosternal lobes nearly half as long again as broad (male) or considerably transverse but shorter than the lobes (female). Tegmina either abbreviated, being one and a half to two and a half times as long as the pronotum and not nearly reaching the tips of the hind femora, tapering considerably beyond the basal expansion, sublanceolate and bluntly subaeuminate (*M. f. curtus*); or far surpassing the hind femora, broad and subequal, very feebly tapering in the apical half and well rounded at tip (*M. f. volaticus*, Plate I, fig. *c*), wholly brownish fuscous or cinereo-fuscous, occasionally maculate to a greater or less degree, but generally slightly in the discoidal area, the anal area sometimes more cinereous than the rest, especially apically; wings in both forms hyaline with a scarcely perceptible yellowish tint, more or less densely but always feebly infumated at the tip, the veins and cross veins of the apical half blackish fuscous. Hind femora relatively longer in the female than in the male, dull luteo-testaceous, black at apex and at extreme base and bifasciate with black or blackish fuscous more or less broadly and obliquely, rarely transversely, the whole often confused and more or less blended on the outer face; beneath pale or dull reddish; hind tibiae red, usually growing paler toward the base and sometimes almost wholly pale greenish luteous, feebly reddening apically, the base generally pale or at least paler, with a small fuscous patellar spot, the spines black except at extreme base, nine to twelve, generally eleven, in number in the outer series. Extremity of male abdomen strongly clavate, well upturned, the supraanal plate long triangular with well rounded acutangulate apex, the apical half depressed to a slightly lower plane, with a broad, equal, deep, median sulcus, bounded by high and sharp walls in a little more than the basal half; furcula consisting of a pair of minute, parallel, distant, tubercular teeth, twice as long as broad, resting outside the ridges of the supraanal plate: cerci simple, straight, and subequal, being contracted a little in the

middle, about four times as long as the mean breadth, directed upward and backward, and the apical upper third incurved and externally tumid, the tip broadly rounded and often feebly downcurved; infracercal plates of the same length as the supraanal; subgenital plate pretty broad and subequal but longer than broad, the apical margin somewhat elevated, well rounded, entire. Basal tooth of lower valves of ovipositor sharp, prominent, triangular, but much longer than broad.

Length of body (*M. f. curtus*), male, 18.5 mm., female, 22 mm.; antennae, male, 10 mm., female, 8 mm.; tegmina, male, 10 mm., female, 9.75 mm.; hind femora, male, 10 mm., female, 11.75 mm. Length of body (*M. f. volatus*), male, 19 mm., female, 20 mm.; antennae, male, 9.75 mm., female, 7.75 mm.; tegmina, male, 17.5 mm., female, 17 mm.; hind femora, male, 11 mm., female, 12 mm.

One hundred and thirty-five males, 192 females. Loon Lake, Colville Valley, Washington, July 23, S. Henshaw (Museum Comparative Zoology); Laggan, Alberta, Bean; The Pas, Saskatchewan River, Rapids of the Saskatchewan River and Point Wigwam, Lake Winnipeg, Scudder (Museum Comparative Zoology; S. H. Scudder); Custer, Black Hills, South Dakota, Bruner (U.S.N.M.—Riley collection); Harneys Peak, Black Hills, South Dakota, 7,000 to 8,000 feet, Bruner (same); Colorado, 5,500 feet, Morrison; Colorado, Alpine, September (U.S.N.M.—Riley collection); Eagle Lake, Missouri, Packard (Museum Comparative Zoology); Charlevoix, Michigan, July 25, Walcott (L. Bruner); Nain, Labrador, W. M. Reed; Salmonier, Newfoundland, in sphagnum swamps, August 11–15, R. Thaxter; Anticosti, A. E. Verrill, August 1 (Museum Comparative Zoology); Moosehead Lake, Maine; Norway, Oxford County, Maine, S. I. Smith; Speckled Mountain, Stoneham, Oxford County, Maine, August 15, 18 (A. P. Morse; Museum Comparative Zoology); Mount Sargent, Mount Desert Island, Maine, August; Bethlehem, Grafton County, New Hampshire, August 11–24 (S. Henshaw); White Mountain valleys, New Hampshire, late July (S. Henshaw; S. H. Scudder); Mount Kearsarge, New Hampshire, 2,000 feet (A. P. Morse); Lynnfield, Essex County, Massachusetts, August 11 (S. Henshaw); Winchendon, Worcester County, Massachusetts, July 4–5 (A. P. Morse); Warwick, Franklin County, Massachusetts, Miss A. M. Edmonds (Museum Comparative Zoology); Dover, Norfolk County, Massachusetts, June 26 (same); Dedham, Norfolk County, Massachusetts, June 14, July 17 (same); Milton and Blue Hills, Norfolk County, Massachusetts, August 14 (S. Henshaw); Concord, Middlesex County, Massachusetts; Waltham, Middlesex County, Massachusetts, July 24, September 5, 9 (A. P. Morse; S. Henshaw); Sherborn, Middlesex County, Massachusetts, June 25, July 12, 15, August 6 (A. P. Morse; Museum Comparative Zoology); Sudbury, Middlesex County, Massachusetts, July 10 (A. P. Morse); Belmont, Middlesex County, Massachusetts, August (same); Melrose, Middlesex County, Massachusetts, July 23 (S. Henshaw); Forest Hills, Suffolk County, Massachusetts, June 24 (same);

Jamaica Plain, Suffolk County, Massachusetts, August 13, 19 (S. Henshaw; S. H. Scudder); Cape Cod, Massachusetts; Provincetown, Barnstable County, Massachusetts, September 5 (A. P. Morse: Museum Comparative Zoology); West Chop, Marthas Vineyard, Massachusetts, July 4-30, August 2-6 (A. P. Morse); Thompson, Windham County, Connecticut, August 4 (same). A specimen (female) in the National Museum, from Alaska perhaps belongs here.

The species has also been reported from Montana (Thomas), north-west Nebraska (Bruner), Souris River, Assiniboia (Scudder), Lake of the Woods, Manitoba (Caulfield), Minnesota (Scudder), mountains east of Middle Park, Colorado (Thomas), and New Jersey (Bentenmüller). It therefore occurs in a broad belt along our northern border from the Atlantic nearly or quite to the Pacific.

As seen in the above description, the species occurs in two forms, a moderately short-winged form, to which the name *M. f. curtus* (Plate XVIII, figs. 2-3) may be given (it was once described as *curtus*); and a very long and broad winged form, which may be called *M. f. volaticus* (Plates I, fig. c; XVIII, fig. 4). The latter is known only from Michigan, and was brought to my attention by Professor Bruner.

During a recent visit to London, Mr. Samuel Henshaw, to whom I had given specimens of this species for the purpose, verified by comparison with the types in the British Museum their identity with Walker's *Caloptenus fasciatus*.

78. MELANOPLUS BOREALIS.

(Plates I, fig. d; XVIII, fig. 5.)

Gryllus grönlandicus KOLLAR, MS., Mus. Vien. (1853), fide FIEBER, Lotos, III, p. 120.

Caloptenus borealis FIEBER, Lotos, III (1853), p. 120; Syn. Eur. Orth. (1854), p. 20.—BRUNNER, Verh. Zool.-Bot. Gesellsch. Wien, 1861 (1861), p. 223; Orth. Stud. (1861), p. 3.—WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 678; Can. Ent., IV (1872), p. 30.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 227.—BRUNER, U. S. Ent. Comm., III (1883), p. 59.—CAULFIELD, Can. Rec. Sc., II (1887), p. 401; Can. Orth. (1887), p. 14.

Pezotettix septentrionalis SAUSSURE, Rev. Mag. Zool., 1861 (1861), p. 159; Orth. Nov. Amer., II (1861), p. 10.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 222.—SCUDDER, Can. Ent., XII (1880), p. 75.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 58.—CAULFIELD, Rep. Ent. Soc. Ont., XVIII (1886), p. 71; Can. Rec. Sc., II (1887), p. 401; Can. Orth. (1887), p. 13.—MORSE, Psyche, VII (1894), p. 53.

? *Caloptenus arcticus* WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), pp. 681-682; Can. Entom., IV (1872), p. 30.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 226.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.—CAULFIELD, Can. Rec. Sc., II (1887), p. 401; Can. Orth. (1887), p. 14.

Podisma septentrionalis WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 718; Can. Ent., IV (1872), p. 30.

Melanoplus borealis CAULFIELD, Rep. Ent. Soc. Ont., XVIII (1886), p. 71.—SCUDDER!, Psyche, VII (1895), p. 320.

? *Melanoplus arcticus* CAULFIELD, Rep. Ent. Soc. Ont., XVIII (1886), p. 71.

Ferrugineo-fuscous. Head not at all prominent, very sparsely pilose. ruf. testaceous, sparsely punctate over the whole face and genae and

feebly flecked with fuscous; vertex very feebly tumid, not elevated above the pronotum, the interspace between the eyes rather broad, half as broad again (male) or more than twice as broad (female) as the first antennal joint; fastigium moderately declivent, distinctly (male) or very feebly and broadly (female) sulcate throughout; frontal costa about as broad as the interspace between the eyes, subequal, percurrent, plane (male) or convex (female) above, the puncta biserially disposed, feebly sulcate at and below the ocellus; eyes not large nor prominent, barely exceeding in length the infraocular portion of the genae; antennae ferruginous, increasingly infuscated beyond the middle, nearly three fourths (male) or scarcely one-half (female) as long as the hind femora. Pronotum short, regularly and noticeably narrowing from behind forward by the gradual constriction of the upper portion, the lateral lobes being steeply and obliquely declivent on the prozona, vertical on the metazona, separated from the nearly plane disk by a tolerably sharp but rounded angle; median carina distinct and sharp on the metazona, indistinct and blunt on the prozona, subobsolete between the sulci; front margin faintly convex, hind margin obtusangulate, the angle rounded; prozona darker on the disk than the metazona, and on the lateral lobes furnished with a broad piceous postocular band, the disk quadrate (male) or transverse (female), scarcely (male) or not (female) longer than the subruguloso-punctate metazona. Prosternal spine moderately long, appressed conico-cylindrical, blunt, retrorse (male) or short, stout, strongly appressed cylindrical, blunt, suberect (female); interspace between mesosternal lobes feebly transverse, narrower than the lobes themselves in both sexes. Tegmina attaining the tips of the hind femora, moderately broad, tapering, well rounded apically, ruddy fuscous, with feeblest possible sparse maculation in the discoidal area; wings not very broad, pellucid, with apically fuscous veins. Fore femora of male scarcely tumescent; hind femora dull ferruginous, broadly bifasciate with blackish fuscous, often more or less confluent on the outer face, the genicular arc black; hind tibiae red, the spines black throughout, ten to eleven in number in the outer series. Extremity of male abdomen clavate, upturned, the supraanal plate long triangular, the apex acutangulate, the basal half of the sides turned upward and in the middle contracted, with a broad, deep, triangular sulcus in the basal half, bounded by high but rounded walls which unite in the middle of the plate; furcula consisting of a pair of adjacent, parallel, slender, tapering, acuminate, slightly depressed fingers, nearly reaching the middle of the supraanal plate; cerci feebly falciform, tapering a little in less than the basal half, the tip a little produced but rounded, the outer surface plane and rather coarsely punctate, not attaining the tip of the supraanal plate; subgenital plate moderately broad, but considerably longer than broad, apically elevated and prolonged, the apical margin broadly rounded, subtransverse, and entire.

Length of body, male, 18 mm., female, 24 mm.; antennae, male, 7.5

mm., female, 6 mm.: tegmina, male, 14 mm., female, 15 mm.; hind femora, male, 10.2 mm., female, 12.2 mm.

Seven males, 6 females. Coast of Labrador, beyond the timber line, at latitude 59° north, Jewell D. Sornberger (specimens collected in spirits).

Fieber also reports it from Greenland and North Cape, Norway. It is, however, not included in the European fauna either by H. Fischer or by Brunner von Wattenwyl; yet Fieber credits specimens to the Vienna Museum, in which city Brunner lives. Hofrath Brunner writes me that he possesses specimens from Labrador, Hudson Bay, and Valdivia, Chile. I can not forbear expressing a doubt about the accuracy of this last locality.

As *Melanoplus* and *Podisma* are the genera of Melanopli most abundant in forms and most widely spread, the former being especially true of *Melanoplus*, and as the present form is the species of *Melanoplus* most nearly allied to *Podisma*, and, like most of the species of the latter genus, is peculiar to high latitudes or altitudes, it seems proper to regard *M. borealis* as an archaic form, perhaps more nearly than any other resembling the original form from which the Melanopli as a whole have descended.

Mr. Samuel Henshaw recently compared for me a female specimen of this species from Labrador with Walker's type of *Caloptenus arcticus* in the British Museum. He found them to agree except in length of wings, which in Walker's specimen, a unique, "extend slightly beyond the abdomen;" the prosternal spine was the same. I have accordingly introduced it in the synonymy with a question mark; if it belongs here the range of the species should be extended to whatever point it may have been in "Arctic America" that Doctor Rye collected his specimen.

The specimens which I have seen were taken by Mr. Sornberger August 15-16 at the Esquimaux village of Rama. He tells me that they were all taken on the banks of a mountain brook fed by the melting snows of the summit near by. They were most abundant where the vegetation was most luxuriant at the borders of the brook; none were found below an elevation of 200 feet nor above 1,500 feet, at which altitude herbaceous plants became few and scattering. Mr. Sornberger can not say upon what it fed, but it was not found on any of the shrubby plants common there—*Betula*, *Vaccinium*, *Ledum*, *Salix*, *Empetrum*, etc., though he thinks he saw it on some of the *Cyperaceae*.

18. ALLENI SERIES.

In this small series the prozona of the male is slightly longitudinal, and the interspace between the mesosternal lobes in the same sex only a little longer than broad. The antennae are very long. The tegmina are always abbreviate, but vary considerably, being either elliptical, attingent, and about as long as the pronotum, or lanceolate, overlapping and reaching a little beyond the middle of the hind femora. The

latter are rather short, and the hind tibiae either red or glaucous, with nine to eleven spines in the outer series.

The supraanal plate is triangular, with raised margins; the furcula consists of a pair of slight and distant or very distant projections; the cerci are stout and heavy, two or three times as long as broad, mesially contracted and apically angulate; the subgenital plate is broad, broader than long by the greater or less elevation of the entire and well-rounded apical margin.

There are but two species known, of medium size, one from New Mexico and the other from Iowa and Dakota.

79. *MELANOPLUS ALLENI*, new species.

(Plate XVIII, fig. 6.)

Of medium size, blackish fuscous, with a ferruginous tinge. Head not prominent, ferrugineo-testaceous more or less infuscated, above with a broad, enlarging, median, fuscous stripe, and a broad piceous postocular band; vertex rather tumid, a little elevated above the pronotum, the interspace between the eyes fully half as broad again as the first antennal joint; fastigium rapidly declivent, very feebly and very broadly sulcate; frontal costa pereurrent, subequal, a little narrower above, about as broad as the interspace between the eyes, feebly sulcate at and below the ocellus, biserially punctate above; eyes rather large and prominent, much longer than the infraocular portion of the genae; antennae ferruginous, almost as long as the hind femora. Pronotum subequal but slightly enlarging on the metazona, with a broad piceous postocular band confined to the prozona, but sometimes appearing very faintly on the metazona, the disk broadly convex and passing by a rounded shoulder nowhere forming lateral carinae into the anteriorly faintly tumid vertical lateral lobes; median carina distinct on the metazona, subobsolete or obsolete on the prozona; front margin truncate, hind margin very obtusangulate; prozona longitudinally subquadrate, about a third longer than the densely and finely punctate metazona. Prosternal spine short, stout, conical; interspace between mesosternal lobes slightly longer than broad. Tegmina moderately abbreviate, reaching a little beyond the middle of the hind femora, moderately broad at base, tapering distinctly and pretty uniformly to a strongly rounded tip, ferrugineo-fuscous. Fore and middle femora considerably tumid in the male; hind femora moderately short but not very stout, flavo-testaceous, obliquely bifasciate with fuscous, the under surface pale carmine, the whole geniculation fuscous; hind tibiae pale red, infuscated at base with a pale annulus beyond, the spines black beyond their base, ten to eleven in number in the outer series. Extremity of male abdomen clavate, strongly recurved, the supraanal plate triangular, with acutangulate apex, feebly and narrowly compressed mesially, with a transverse median plica, the margins broadly and considerably elevated, the median sulcus pereurrent between moderately

high and rather sharp walls; furcula consisting of a pair of minute, distant denticulations; cerci moderately broad and stout at base, gradually narrowing to two-thirds the width in the middle, beyond very faintly enlarging, the tip rounded but slightly angulate, the whole sub-erect, feebly incurved, and only apically strongly compressed, fully as long as the supraanal plate; subgenital plate as broad as long by the considerable rounded elevation of the apical margin, which has a scarcely perceptible thickening, is entire, and, as seen from above, regularly and strongly arcuate, with no lateral angles, the base of the lateral margins rectangulate, slightly incurved.

Length of body, male, 17 mm.; antennae, 10 mm.; tegmina, 9 mm.; hind femora, 10.75 mm.

Two males. Crawford County, Iowa, July 13-24, J. A. Allen; explorations in Dakota under General Sully, S. M. Rothhammer.

This species is very closely related to *Mel. fasciatus*, but has an apically broader, less thickened, and regularly arcuate subgenital plate, and slightly different cerci, these being considerably broader at base than apically. It is named for my ornithological friend, Mr. J. A. Allen, of the American Museum of Natural History, who many years ago obtained for me much of the material on which this memoir is based.

80. MELANOPLUS SNOWII, new species.

(Plate XVIII, fig. 7.)

Of medium size, moderately stout, dark brownish fuscous. Head not prominent, pallid testaceous more or less begrimed with fuscous, above almost wholly fuscous, separated by a pallid testaceous streak from the broad piceous postocular band; vertex somewhat tumid, elevated slightly above the pronotum, the interspace between the eyes nearly (male) or fully (female) half as broad again as the first antennal joint; fastigium gently declivent, broadly and in the female slightly sulcate; frontal costa fading before the clypeus, equal, nearly (male) or quite (female) as broad as the interspace between the eyes, feebly sulcate at and briefly below the ocellus, punctate throughout; eyes moderately large, moderately and in the two sexes equally prominent, but little longer than the infraocular portion of the genae; antennae basally ferruginous. Pronotum feebly and gradually enlarging from in front posteriorly, the disk blackish fuscous with lateral stripes of pallid testaceous at least in the male, the lateral lobes testaceous or ferruginous, with a very broad piceous postocular band confined to the prozona; disk considerably convex, passing by a slight shoulder (better marked in the female than in the male and forming feeble lateral carinae) into the tumid but inferiorly vertical lateral lobes; median carina low but tolerably distinct, equal, percurrent; front margin truncate, hind margin rotundato-obtusangulate; prozona longitudinal (male) or quadrate (female), nearly a half (male) or about a fourth (female) longer than the shallowly but closely punctate metazona. Prosternal spine stout and not

very long, appressed conical, blunt, erect; interspace between mesosternal lobes a little longer than broad (male) or distinctly transverse but narrower than the lobes (female). Tegmina abbreviate, about as long as the pronotum, attingent, elliptical, but attenuate basally, well rounded apically, a little less than twice as long as broad, dark brownish fuscous. Fore and middle femora somewhat tumid in the male; hind femora not very slender, blackish fuscous on the upper two-thirds of the outer face inclosing a small median testaceous spot, fuscous on the upper face externally, with the outer carina dull flavous, the inner face and inner half of upper face flavous more or less broadly bimaculate or bifasciate with fuscous, the lower third of outer face flavous, becoming pale orange below like the lower face, the genicular are black and the lower genicular lobe more or less infuscated; hind tibiae pale red or glaucous, pallid at extreme base, the spines black on the apical half, nine to eleven in number in the outer series. Extremity of male abdomen strongly clavate, strongly recurved, the supraanal plate concealed in the single specimen seen; furcula consisting of a pair of very distant, very slight, parallel spines, shorter than the last dorsal segment; cerci large and broad, wholly inbent, subequal laminae, somewhat and not very broadly constricted in the middle, the apical portion as broad as and longer than the basal, and broadly and angularly sulcate, apically angulate, the whole somewhat more than twice as long as broad; subgenital plate somewhat longer than the basal breadth, subequal except for the elevation of the apical margin, which, as seen from above, is transverse, entire, and makes the apical breadth equal to the length.

Length of body, male, 17.5 mm., female, 22.5 mm.; tegmina, male and female, 4.5 mm.; hind femora, male and female, 11 mm.

One male, 1 female. Magdalena, Socorro County, New Mexico. July. F. H. Snow (University of Kansas).

The antennae of both specimens are imperfect. The species is named for Chancellor F. H. Snow, of the University of Kansas, and Mr. W. A. Snow, of the same institution, father and son, entomologists of note.

19. FEMUR-RUBRUM SERIES.

This is a dominant and homogeneous group of medium or rather small-sized species, in which the male prozona varies from slightly transverse to slightly longitudinal, and the interspace between the mesosternal lobes in the same sex is as in the spretus series. The tegmina are always fully developed or a little abbreviated (so as to fall a little short of the tip of the hind femora), immaculate or slightly maculate along the middle line. The hind tibiae are normally red and have ten to fourteen spines in the outer series.

The supraanal plate is clypeate, longer than broad and mesially constricted. The furcula consists of a pair of parallel or nearly parallel, long or moderately long, generally separated, slender, tapering, subcylindrical fingers or spines. The cerci are compressed subfalcate

laminae, the apical half generally about half as broad as the base, arcuate and with the upper inner portion of the tip produced. The subgenital plate is peculiar for being very broad at base and narrowing so as to be at apex only about half as broad as at base (which does not show in the figures), the whole lower margin nearly straight while the upper is sinuous, the apical margin not elevated, entire (in one species very broadly and shallowly emarginate, or rather laterally tuberculate) and, as viewed above, broadly rounded.

The species, five in number, are spread all over the continent from Atlantic to Pacific, from central Labrador to central Florida, and from central Alaska, the Mackenzie River and Hudson Bay to Texas and central Mexico; they also extend to high altitudes above the forest line. No other series of *Melanoplus* has quite so wide an area of distribution, the *bivittatus* series, however, approaching it closely.

81. MELANOPLUS PLUMBEUS.

(Plate XVIII, fig. 8.)

Caloptenus plumbum DODGE!, Can. Ent., IX (1877), p. 112.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 42.—BRUNER, *ibid.*, III (1883), p. 60.

Melanoplus plumbeus BRUNER, Bull. Div. Ent. U. S. Dep. Agric., XVIII (1893), pp. 32-33, fig. 16; Publ. Nebr. Acad. Sc., III (1893), p. 28.

Of medium size, very dark fusco-olivaceous, with bright luteous or flavous markings. Head feebly prominent, mostly luteous or flavous, more or less infuscated above and especially clouded or flecked with fuscous along the lateral margins of the fastigium and posterior to them, and with a blackish postocular band; vertex somewhat tumid, the interspace between the eyes nearly (male) or more than (female) half as broad again as the first antennal joint; fastigium steeply declivent, feebly expanding anteriorly, shallowly sulcate throughout; frontal costa somewhat prominent above, slightly contracted between the antennae, otherwise subequal and as wide as the interspace between the eyes, hardly reaching the clypeus, feebly sulcate at and below the ocellus, biserially punctate throughout; eyes moderately large, not very prominent, distinctly longer, especially in the female, than the infraocular portion of the genae; antennae more or less ferruginous, apically infuscated, less than three-fourths (male) or hardly more than one-half (female) as long as the hind femora. Pronotum subequal, very feebly and uniformly expanding posteriorly, especially in the female, the disk dark fusco-olivaceous, with a slender, median, flavous stripe and more or less distinct lateral stripes of the same upon the carinae, expanding upon the metazona, the lateral lobes mostly flavous (sometimes obscured with fuscous), the prozona marked above with a broad piceous band; disk nearly plane, passing by abruptly rounded shoulders, hardly forming true carinae, into the vertical lateral lobes; median carina distinct but slight throughout, hardly less elevated on the prozona; front margin truncate, hind margin obtusangulate; prozona

quadrate or feebly longitudinal (male) or a little transverse (female), scarcely or not longer than the closely punctate metazona. Prosternal spine moderately long, erect, cylindrical, in the female slightly appressed, blunt; interspace between mesosternal lobes fully half as long again as broad (male) or feebly transverse (female). Tegmina generally surpassing a little the hind femora, of moderate breadth, distinctly tapering, olivaceo-fuscous, immaculate or with a feeble line of minute maculations along the discoidal area; wings hyaline, glistening and iridescent, with pale fuscous veins darker next the apex. Fore and middle femora scarcely tumid in the male; hind femora blackish olivaceous on the outer face excepting sometimes on the lower margin, elsewhere flavous or luteo-flavous, with two broad blackish olivaceous maculations above, especially on the inner side; hind tibiae feebly valgate, red, the spines black excepting at base, eleven to thirteen in number in the outer series. Extremity of male abdomen considerably clavate, somewhat recurved, the supraanal plate subelypate but mesially contracted, apically rectangular, the margins considerably elevated, forming deep valleys between them and the opposite curved ridges bordering the median sulcus; the latter is deep, gradually contracts toward the middle and then rapidly expands and shallows (in the specimen chosen for illustration the apical portion is concealed); furcula consisting of a pair of basally adjacent, apically tapering, parallel, acuminate fingers, nearly half as long as the supraanal plate, lying in the valleys of the same; cerci subfalciform lamellae, which taper rapidly in the basal half and beyond are less than half as broad, slightly incurved and upcurved, apically tapering by the curve of the lower margin, the tip blunt and falling short of the extremity of the supraanal plate; subgenital plate broad at base, narrowing rapidly, the extremity hardly more than half as broad as the base, the lateral margins strongly arcuate, the apical margin even, entire, well rounded.

Length of body, male 20 mm., female 25 mm.; antennae, male 8.5 mm., female 6.75 mm.; tegmina, male 17 mm., female 17.5 mm.; hind femora, male 12 mm., female 13.25 mm.

Fifteen males, 29 females. Colorado, 5,500 feet, Morrison (S. Henshaw; S. H. Scudder; U.S.N.M.—Riley collection); Pueblo, Colorado, 4,700 feet, August 30–31; Colorado Springs, El Paso County, Colorado, August, E. S. Tucker (University of Kansas); Manitou, El Paso County, Colorado (L. Bruner); Topeka, Shawnee County, Kansas, October 31; Nebraska, Dodge.

Dodge originally described it from Glencoe, Dodge County, Nebraska, and it has since been recorded by Bruner from Canyon City, Fremont County, Colorado, and the plains of Wyoming.

This species, especially in life, is strikingly different from the next two in coloring, though the male abdominal appendages are exceedingly similar. According to Bruner it is more clumsy in its movements than *M. femur-rubrum*.

82. MELANOPLUS FEMUR-RUBRUM.

(Plates I, fig. h; XIX, figs. 1-4.)

- Acridium femur-rubrum* DE GEER!, Mém. Hist. Ins., III (1773), p. 498, pl. XLII, fig. 5.—GOEZE, De Geer, Gesch. Ins., III (1780), p. 324, pl. XLIII, fig. 5.—HARRIS, Hitchc. Rep. Mass. (1833), p. 583; *ibid.*, 2d ed. (1835), p. 576; Cat. Anim. Mass. (1835), p. 56; Treat. Ins. Inj. Veg. (1841, 1842), p. 141; *ibid.*, 2d ed. (1852), p. 151; *ibid.*, 3d ed. (1862), p. 174.
- Gryllus (Locusta) femur-rubrum* GOEZE, Ent. Beytr., II (1778), p. 115.
- Gryllus (Locusta) erythropus* GMELIN, Linn., Syst. Nat., I, Pt. IV (1788), p. 2086.
- Acridium femorale* OLIVIER, Enc. Méth., VI (1791), p. 228.
- Gryllus erythropus* TURTON, Syst. Nat. Linn., II (1806), p. 568.
- Caloptenus femur-rubrum* BURMEISTER, Handb. Entom., II (1838), p. 638.—PACKARD, Rep. Nat. Hist. Me., 1861 (1861), p. 374.—SCUDDER, Can. Nat., VII (1862), p. 287; Bost. Journ. Nat. Hist., VII (1862), p. 464.—WALSH, Trans. Ill. St. Agric. Soc., V (1865), p. 497; Pract. Ent., II (1866), p. 1.—GLOVER, Rep. U. S. Dep. Agric., 1867 (1867), p. 65.—PACKARD, Amer. Nat., I (1867), p. 330.—SCUDDER, Proc. Bost. Soc. Nat. Hist., XII (1868), p. 87.—SMITH, Proc. Portl. Soc. Nat. Hist., I (1868), p. 150.—WALSH, Rep. Ins. Ill., I (1868), p. 99.—WALSH, RILEY, Amer. Ent., I (1868), p. 16.—LACKARD, Guide Ins. (1869), p. 569.—RATHVON, Amer. Ent., II (1869-70), p. 88.—WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 678.—GLOVER, Rep. U. S. Dep. Agric., 1870 (1870), p. 76, fig. 32; *ibid.*, 1871 (1871), p. 78, fig. 12.—KÖPPEN, Peterm. Geogr. Mitth., 1871 (1871), p. 361.—THOMAS, Ann. Rep. U. S. Geol. Surv. Terr., II (1871), p. 265; (pars) *ibid.*, V (1872), p. 451.—DODGE, Can. Ent., IV (1872), p. 15.—SMITH, Rep. Conn. Bd. Agric., 1872 (1872), pp. 362, 381, fig.—WALKER, Can. Ent., IV (1872), p. 30.—LEBARON, Ann. Rep. Nox. Ins. Ill., II (1872), p. 158.—SCUDDER, Fin. Rep. U. S. Geol. Surv. Nebr. (1872), pp. 250, 252, 253-257.—GLOVER, Ill. N. A. Ent., Orth. (1872), pl. v, fig. 11, pl. VIII, fig. 2; Rep. U. S. Dep. Agric., 1872 (1872), p. 121; *ibid.*, 1873 (1873), p. 136, fig. 6.—THOMAS (pars), Rep. U. S. Geol. Surv. Terr., V (1873), p. 163.—PACKARD, Amer. Nat., VIII (1874), p. 502.—RILEY, Ann. Rep. Ins. Mo., VII (1875), p. 126, figs. 26, 29.—BETHUNE, Ann. Rep. Ent. Soc. Ont., 1874 (1875), fig. 33.—THOMAS, Key Ill. Orth. (1875), p. 3; Proc. Dav. Acad. Sc., I (1876), p. 260; Bull. Ill. Mus. Nat. Hist., I (1876), p. 68.—WHITMAN, Grasshopper (1876), pp. 18-19, 2 figs.—RILEY, Rep. Ins. Mo., VIII (1876), pp. 114-118, 153; *ibid.*, IX (1877), p. 86; Loc. Plague (1877), pp. 14-17, 27, figs. 1, 4.—BESSEY, Bienn. Rep. Iowa Agric. Coll., VII (1877), p. 209.—PACKARD, Amer. Nat., XI (1877), p. 422.—RILEY, *ibid.*, XI (1877), p. 665.—BRUNER, Can. Ent., IX (1877), p. 144.—THOMAS, Rep. Ent. Ill., VI (1877), p. 45; Bull. U. S. Geol. Surv. Terr., IV (1878), p. 499; Rep. U. S. Ent. Comm., I (1878), pp. 50-52; Ann. Rep. Chief Eng., 1878 (1878), p. 1845.—PACKARD, Rep. U. S. Ent. Comm., I (1878), pp. 77, 135, [141-144].—RILEY, *ibid.*, I (1878), pp. 220, 224, 225, 226, 284, 299, 444-446, 447, 458, pl. II; Amer. Nat., XII (1878), p. 285.—THOMAS, Rep. Ent. Ill., VII (1878), pp. 35, 38-40, figs. 5, 7.—GIRARD, Traité élém. d'ent., II (1879), p. 248.—RILEY, Amer. Ent., III (1880), p. 220.—THOMAS, Rep. Ent. Ill., IX (1880), pp. 91, 95-96, 124-126, figs. 22-23; Rep. U. S. Ent. Comm., II (1881), pp. 106-107.—PACKARD, Amer. Nat., XV (1881), pp. 285-302, 372-379, pl. I; Nat. Leis. Hour, V (1881), No. 4, p. 8, figs.—BOWLES, Ann. Rep. Ent. Soc. Ont., 1880 (1881), p. 29, fig. 11.—LINTNER, Ins. Clover (1881), p. 5; Ann. Rep. Ins. N. Y., I (1882), p. 7, fig. 3b.—GRATACAP, Amer. Nat., XVI (1882), p. 1022.—BRUNER, Rep. U. S. Ent. Comm., III (1883), pp. 10, 14, 54.—SAUNDERS, Ins. Inj. Fruit (1883), p. 157, fig. 164.—OSBORN, Bull. Iowa Agric. Coll., Dept. Ent., II (1884), p. 83.—BRUNER, Rep. U. S. Ent., 1884 (1885), p. 399.—CAULFIELD, Rep. Ent. Soc. Ont., XVIII (1886), pp. 66, 67, fig. 20.—COOK, Ent. Amer., I (1886), p. 209; Beal's Grasses N. A., I

(1887), pp. 373, 396, 409, fig. 157.—RILEY, *Ins. Life*, I (1888), p. 87.—WEED, *Bull. Ohio Exp. St., Techn. Ser.*, I (1889), p. 40.—LUGGER, *Rep. Agric. Exp. St. Minn.* (1889), p. 339, figs. 12, 14; *Bull. Agric. Exp. St. Minn.*, VIII (1889), pp. 32, 33, pl. II.—MANN, *Proc. Ent. Soc. Wash.*, II (1890), p. 73.—PACKARD, *Ins. Inj. For.* (1890), p. 513.—RILEY, *Bull. Div. Ent. U. S. Dep. Agric.*, XXV (1891), pp. 27-28, fig. 5.—OSBORN, *Goss, Bull. Iowa Exp. St.*, XIV (1891), p. 175.—HOWARD, *Ins. Life*, VII (1895), p. 274.—WILLCOX, *Bull. Mus. Comp. Zool.*, XXVII (1895), pp. 9-28, pls. III-v; *ibid.*, XXIX (1896), pp. 193-203, pls. I-III.

Acridium (Caloptenus) femur-rubrum DE HAAN, *Bijdr. Kenn. Orth.* (1842), p. 143.—RATHVON, *Rep. U. S. Dep. Agric.*, 1862 (1862), p. 384, pl., fig. 23.

Pezotettix (Melanoplus) femur-rubrum STÅL, *Rec. Orth.*, I (1873), p. 79.

Melanoplus femur-rubrum SCUDDER!, *Hitchc. Rep. Geol. N. H.*, I (1874), p. 375; *Proc. Bost. Soc. Nat. Hist.*, XIX (1878), pp. 285, 287; *Ent. Notes*, VI (1878), pp. 44, 46; *Rep. U. S. Ent. Comm.*, II (1881), App., p. 24.—BRUNER, *ibid.*, III (1883), p. 60; *Can. Ent.*, XVII (1885), p. 17; (pars), *Bull. Washb. Coll.*, I (1885), p. 137.—FLETCHER, *Rep. Ent. Can.*, 1885 (1885), p. 10, fig. 2.—CAULFIELD, *Can. Ent.*, XVIII (1886), p. 212.—RILEY, *Rep. U. S. Ent.*, 1885 (1886), p. 233.—BRUNER, *ibid.*, 1885 (1886), pp. 303, 307; *Bull. Div. Ent. U. S. Dep. Agric.*, XIII (1887), p. 33; *Rep. Ent. Nebr. P. Agric.*, 1888 (1888), p. 88, fig. 5.—CAULFIELD, *Rep. Ent. Soc. Ont.*, XVIII (1888), p. 71.—COMSTOCK, *Intr. Ent.* (1888), pp. 108, 110, figs. 83, 98.—FERNALD, *Orth. N. E.* (1888), pp. 31, 33; *Ann. Rep. Mass. Agric. Coll.*, XXV (1888), pp. 115, 117.—FLETCHER, *Rep. Exp. Farms Can.*, 1888 (1889), p. 63, fig. 6; *Ann. Rep. Ent. Soc. Ont.*, XIX (1889), p. 10, fig. 7.—RILEY, *Ins. Life*, II (1889), p. 87.—DAVIS, *Ent. Amer.*, V (1889), p. 81.—SMITH, *Cat. Ins. N. J.* (1890), p. 412.—LINTNER, *Rep. Ins. N. Y.*, VI (1890), pp. 151-153, fig. 23.—KOEBELE, *Bull. Div. Ent. U. S. Dept. Agric.*, XXII (1890), p. 94.—TOWNSEND, *Proc. Ent. Soc. Wash.*, II (1891), p. 43.—BLATCHLEY, *Can. Ent.*, XXIII (1891), p. 98.—BRUNER, *ibid.*, XXIII (1891), p. 194; *Ins. Life*, III (1891), p. 229; *ibid.*, IV (1891), p. 22; *Rep. Ent. Soc. Ont.*, XXII (1891), pp. 48-49.—SOUTHWICK, *Ins. Life*, IV (1891), p. 24.—COOK, *ibid.*, IV (1891), p. 24.—WEBSTER, *ibid.*, IV (1891), p. 24.—SOUTHWICK, *Rep. Ent. Soc. Ont.*, XXII (1891), p. 5.—COOK, *ibid.*, XXII (1891), p. 5.—WEBSTER, *ibid.*, XXII (1891), p. 5.—BRUNER, *Bull. Div. Ent. U. S. Dep. Agric.*, XXIII (1891), p. 59.—MCNEILL, *Psyche*, VI (1891), p. 74.—OSBORN, *Goss, Bull. Iowa Agric. Exp. St.*, XV (1891), p. 267.—BRUNER, *Ann. Rep. St. Bd. Agric. Nebr.*, 1891 (1891), pp. 243, 306, fig. 80; *Bull. Div. Ent. U. S. Dep. Agric.*, XXVII (1892), pp. 24, 33.—OSBORN, *Proc. Iowa Acad. Sc.*, I, Pt. II (1892), p. 118.—KELLOGG, *Inj. Ins. Kans.* (1892), pp. 41-42.—SMITH, *Bull. N. J. Exp. St.*, XC (1892), pp. 4, 6, 31, fig. 4f.—SCUDDER, *Rep. Ent. Soc. Ont.*, XXIII (1893), p. 75.—BRUNER, *Publ. Nebr. Acad. Sc.*, III (1893), p. 28; *Rep. Nebr. St. Bd. Agric.*, 1893 (1893), pp. 458-459, fig. 98.—OSBORN, *Ins. Life*, V (1893), pp. 323-325; *ibid.*, VI (1893), pp. 80-81; *Papers Iowa Ins.* (1893), p. 57, fig. 27.—SMITH, *Ent. News*, IV (1893), p. 48.—TOWNSEND, *Ins. Life*, VI (1893), p. 31.—BRUNER, *Bull. Div. Ent. U. S. Dep. Agric.*, XXVIII (1893), pp. 30-32, fig. 15; *ibid.*, XXX (1893), p. 35; *Rep. St. Agric. Soc. Nebr.*, 1894 (1894), pp. 163, 205, fig. 68.—ASHMEAD, *Ins. Life*, VII (1894), p. 26.—MORSE, *Psyche*, VII (1894), pp. 53, 106.—BEUTENMÜLLER, *Bull. Amer. Mus. Nat. Hist.*, VI (1894), p. 306, pl. VIII, fig. 7.—COCKERELL, *Trans. Am. Ent. Soc.*, XX (1894), p. 337.—BRUNER, *Nebr. St. Hort. Rep.*, 1895 (1895), p. 69.—COMSTOCK, *Elem. Ins. Anat.* (1895), pp. 8-27; *Man. Study Ins.* (1895), p. 110, fig. 120.—LINTNER, *Rep. St. Mus. N. Y.*, XLVIII (1895), pp. 440-443, fig. 19.—WILLCOX, *Observer*, VII (1896), pp. 184-192, figs. 1-4, 6-9, 11-16.

Caloptenus devorator SCUDDER!, *Proc. Bost. Soc. Nat. Hist.*, XVII (1875), pp. 474-475; *Ent. Notes*, IV (1875), pp. 73-74; *Cent. Orth.* (1879), pp. 18-19.—THOMAS, *Rep. U. S. Ent. Comm.*, I (1878), p. 42.

Caloptenus sanguinolentus PROVANCHER!, Nat. Can., VIII (1876), p. 109.

Caloptenus allanis PROVANCHER!, Faune Ent. Can., II (1877), p. 35.

Pezotettix femur-rubrum STÅL, Bih. K. Sv. Vet.-Akad. Handl., V (1878), No. 9, p. 13.—FORBES, Rep. Ins. Ill., XIII (1884), pp. 62, 87, pl. x, fig. 1; *ibid.*, XIV (1885), p. 23.—WEED, Misc. Ess. Econ. Ent. Ill. (1886), p. 48.—HUNT, *ibid.* (1886), pp. 119, 126.—WEED, Rep. Ent. Ill., XV (1889), p. 40.—GARMAN, Orth. Ky. (1894), pp. 3, 8.

Melanoplus interior SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), pp. 71-72; Cent. Orth. (1879), pp. 60-61.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 61.

Melanoplus devorator SCUDDER, Cent. Orth. (1879), p. 84.

Caloptenus (Melanoplus) femur-rubrum CAULFIELD, Can. Rec. Sc., II (1887), p. 401; Can. Orth. (1887), p. 17.

Of medium size, brownish fuscous, often with a more or less feeble ferruginous tinge, particularly in the female. Head a little prominent, olivaceo-plumbeous, above much infuscated, especially in a pair of widening stripes behind the lateral margins of the fastigium, and with a piceous postocular stripe; interspace between the eyes distinctly wider than (male) or fully twice as wide as (female) the first antennal joint; fastigium strongly declivent, considerably (male) or shallowly (female) sulcate, but variable; frontal costa just failing to reach the clypeus, subequal, as broad as the interspace between the eyes, sulcate at and below the ocellus, biserially punctate above; eyes moderately prominent in the male, not at all so in the female, much longer, especially in the male, than the infraocular portion of the genae; antennae ferruginous or luteo-ferruginous, often a little infuscated apically, about four-fifths (male) or three-fifths (female) as long as the hind femora. Pronotum feebly and rather regularly expanding posteriorly, the disk faintly convex and passing by a well-rounded shoulder (somewhat abruptly on the metazona) into the anteriorly tumid vertical lateral lobes, the disk generally darker than the lower portion of the lateral lobes (occasionally by a darker punctation) sometimes irregularly marked with luteous, the upper part of the lateral lobes crossed by a broad piceous band on the prozona, the lower portion more or less closely copying the coloring of the face but usually a little darker; median carina slight, percurrent, a little (rarely much) less distinct on the prozona than on the metazona; front margin subtruncate, very faintly and very narrowly flaring, at least in the male; hind margin obtusangulate, more obtusely in the female than in the male; prozona quadrate or feebly longitudinal (male) or feebly transverse, rarely quadrate (female), slightly or not longer than the closely but shallowly punctate metazona. Prosternal spine rather large, appressed cylindrical, very blunt, often mesially constricted a little, feebly retrorse; interspace between mesosternal lobes nearly twice as long as broad (male) or a little longer than broad (female). Tegmina (Plate I, fig. *h*) almost invariably surpassing, sometimes but slightly, more often considerably, the hind femora, of moderate breadth, distinctly though very gradually tapering, brownish fuscous, sometimes immaculate, sometimes sprinkled

with fuscous dots of greater or less depth and distinctness throughout the greater part of the discoidal area, but rarely to any considerable extent or conspicuousness beyond the middle; wings moderately broad, hyaline, glistening, with fuscous veins and cross veins darkest apically and anteriorly. Thoracic pleura piceous or blackish fuscous, the metathoracic episterna with a mesial streak of flavous of greater or less clarity. Fore and middle femora distinctly but not greatly tumid in the male; hind femora olivaceo-testaceous, more or less heavily and very variably obscured or clouded with fuscous, the fuscous coloring generally confined to the upper half, and above generally concentrated in two fasciae, which sometimes extend partly in an oblique direction on the outer face, but generally in a very obscure fashion, if at all, while the whole under surface and at least the basal half of the inner surface is more or less impure flavous, sometimes deepening, especially beneath, to ferruginous or even carmine; hind tibiae normally red, sometimes with a slight fuscous patellar spot, occasionally more or less tinged with yellowish, very rarely pale green with a yellowish tinge, the spines black nearly to their base, ten to thirteen, usually eleven, in number in the outer series. Extremity of male abdomen rather strongly clavate, well recurved, the supraanal plate clypeate, strongly and rather abruptly contracted mesially, the apex subrect-angulate, the lateral margins elevated, the apical portion more or less deflexed, the median sulcus rather large, not very deep, bounded by moderate but rather abrupt walls, apically expanding and obsolescent; furcula consisting of a pair of subparallel or sometimes feebly divergent, tapering, subacuminate, apically well separated, more or less feebly depressed fingers, falling a little short of the middle of the supraanal plate, and except at extreme base lying on the outer side of the ridges bounding its median sulcus; cerci rudely subfalciiform, compressed laminae, tapering considerably and rather rapidly from base to middle, beyond that subequal but apically very obliquely truncate, so that the upper angle is considerably produced but blunt, the whole somewhat incurved and failing to reach the tip of the supraanal plate; infracercal plates exceedingly broad at base, extending laterally far beyond the sides of the cerci, as long as the supraanal plate; subgenital plate very short apically so as to be less than half the breadth of the base, the lower margin straight, the lateral margin very sinuous, the apical margin not elevated, strongly rounded, entire.

Length of body, male, 23.5 mm., female, 24.5 mm.; antennae, male, 10 mm., female, 8.5 mm.; tegmina, male, 21.5 mm., female, 19.75 mm.; hind femora, male, 13 mm., female, 14.25 mm.

Five hundred and seven males, 556 females. Halifax, Nova Scotia, H. Piers; Montreal, Canada, Caulfield; Grand Manan Island (Museum Comparative Zoology); Eastport, Washington County, Maine, Verrill (same); Moosehead Lake, Maine; Norway, Oxford County, Maine, Smith (Museum Comparative Zoology); Bridgton, Cumberland County,

Maine (S. Henshaw); York, Maine (same); Bethlehem, Grafton County, New Hampshire, L. Agassiz (Museum Comparative Zoology; S. Henshaw); White Mountains, New Hampshire, the subalpine region and valleys (S. H. Scudder; S. Henshaw; A. P. Morse); Hancock, Hillsboro County, New Hampshire (S. Henshaw); Mount Kearsarge, 2,000 to 3,251 feet (A. P. Morse); Sudbury, Rutland County, Vermont; Bridport, Addison County, Vermont, Miss A. M. Edmonds (Museum Comparative Zoology); Chateaugay Lake, Adirondacks, New York, 2,000 feet, F. C. Bowditch; summit of Greylock, Berkshire County, Massachusetts (A. P. Morse; S. H. Scudder); Williamstown, Berkshire County, Massachusetts; Adams, Berkshire County, Massachusetts (A. P. Morse); Springfield, Hampden County, Massachusetts, Allen (Museum Comparative Zoology); Warwick, Franklin County, Massachusetts, Miss A. M. Edmonds (same); North Andover, Essex County, Massachusetts, Emerton (same); Salem, Essex County, Massachusetts, Kingsley (same); numerous localities in the vicinity of Boston, Massachusetts (Museum Comparative Zoology; A. P. Morse; S. Henshaw; S. H. Scudder); Provincetown, Barnstable County, Massachusetts; Nantucket, Massachusetts (S. Henshaw; S. H. Scudder); Penikese Island, Massachusetts (Museum Comparative Zoology); Canaan and South Kent, Litchfield County, Connecticut (A. P. Morse); Long Island, New York; Maryland, Uhler; Washington, D. C. (Museum Comparative Zoology; U.S.N.M.; S. Henshaw); Pattonville, Cambria County, Pennsylvania, Shaler (Museum Comparative Zoology); Vigo County, Indiana (W. S. Blatchley); Agricultural College, Mississippi, H. E. Weed; Michigan, M. Miles; Detroit, Michigan, H. Gillman; Illinois, Thomas (U.S.N.M.—Riley collection); northern Illinois, Kennicott; Ogle County, Illinois, Allen; Chicago, Cook County, Illinois; West Northfield, Cook County, Illinois, Kennicott (Museum Comparative Zoology); Moline, Rock Island County, Illinois, McNeill; southern Illinois, Barnes (Museum Comparative Zoology); Newport, Campbell County, Kentucky, Willard (Museum Comparative Zoology); Minnesota; Winnipeg, Manitoba, Kennicott; Muscatine, Iowa, Witten (U.S.N.M.—Riley collection); Dallas County, Iowa, Allen, "rather common;" Crawford County, Iowa, Allen; Brookfield, Linn County, Missouri, E. P. Austin; Bushberg, Jefferson County, Missouri (U.S.N.M.—Riley collection); St. Louis, Missouri (same; S. H. Scudder); New Madrid, Missouri, Kennicott; Boone County, Missouri (U.S.N.M.—Riley collection); Topeka, Kansas; West Point, Cuming County, Nebraska (U.S.N.M.—Riley collection); Nebraska City, Otoe County, Nebraska, Hayden; Platte River, Nebraska, Hayden; Fort Robinson, Dawes County, Nebraska (U.S.N.M.—Riley collection); Colorado (same); Denver, Colorado; Garden of the Gods, El Paso County, Colorado; Pueblo, Colorado, 4,700 feet; Garland, Costilla County, Colorado, 8,000 feet; Colorado, latitude 38°, Lieutenant Beckwith; Fruita, Mesa County, Colorado (U.S.N.M.); White River, Rio Blanco County, Colorado; Dakota, Rothhammer; Yellowstone, Hayden; Yellowstone, Montana (U.S.N.M.—Riley collection);

Montana (same); Yellowstone National Park; Salmon City, Lemhi County, Idaho (U.S.N.M.—Riley collection; L. Bruner); British Columbia and Vancouver Island, Crotch; Portland, Multnomah County, Oregon, H. Edwards (S. H. Scudder; U.S.N.M.—Riley collection); Sissons, Siskiyou County, California, Packard (same); Sierra Nevada, Wheeler's Expedition, 1876; Camp Hallock, Nevada, E. Palmer; Glenbrook, Douglas County, Nevada (U.S.N.M.—Riley collection); Utah (L. Bruner); Utah, Packard (Museum Comparative Zoology); Salt Lake Valley, Utah, 4,300 feet (S. H. Scudder; U.S.N.M.—Riley collection); Spring Lake Villa, Utah County, Utah, E. Palmer (same); Provo, Utah County, Utah; Wahsatch Mountains, near Beaver, Utah, Palmer; Fort Whipple, Yavapai County, Arizona, E. Palmer; Las Cruces, Donna Ana County, New Mexico, Cockerell (L. Bruner); Texas, Bel-fragre, Lincecum; Dallas, Texas, Boll (S. H. Scudder; U.S.N.M.—Riley collection); San Antonio, Bexar County, Texas (U.S.N.M.—Riley collection); Carrizo Springs, Dimmit County, Texas, A. Wadgymer (L. Bruner); Mexico, Botteri, Sumichrast; Guanajuato, Mexico (U.S.N.M.); Queretaro, Mexico (L. Bruner); Otoyac, Vera Cruz, Mexico, 2,700 feet (same).

It has also been reported from Arctic America¹ (Walker); Great Bear Lake¹ (Scudder); Labrador¹ (Packard); Canada (Bethune, Caulfield, Fletcher); Quebec (Provancher); Mount Ktaadn, Maine (Packard); New Jersey (Smith); Pennsylvania (De Geer); Ohio and West Virginia (Glover); Kentucky (Glover, Garman); Tennessee (De Haan), and Wyoming (Thomas). Specimens from Florida which I formerly referred to this species probably belong to the next.

It therefore appears to inhabit the entire United States and the settled parts of Canada, excepting only Alaska and also the southeastern United States (where it is replaced by the next species), and occurs south of our border as far as central Mexico.

The species described by me as *M. interior* was based upon specimens from Utah and other parts of the interior of the western country, which seem to differ from those found elsewhere in having cerci which taper more gradually and show less contrast in the width of the basal and apical halves, and at tip are blunter and less manifestly truncate, in which also the forks of the furcula are relatively longer and more strictly parallel, the tegmina rather shorter and generally lacking any maculation whatever; the prosternal spine also is more frequently compressed before the tumid tip; but on comparing a large series of specimens from these western regions I find it impossible to draw any line of demarcation, some specimens having some but not other of these characteristics, so that I can only regard the species as in a state of flux in this region, preparing, as it were, to divide into distinct races not yet clearly enough defined to distinguish them.

¹ The first three references are doubtful; they probably belong to *M. extremus*.

M. devorator was founded upon specimens of strikingly contrasted coloration found in Texas, which I have since seen from many other places; but as they are united with the type by complete series of intergrades, I am forced to conclude them to be only extreme colorational variations, which can not be dignified even as races.

Specimens with green or greenish hind tibiae have been seen by me from the alpine region of the White Mountains, New Hampshire, Cape Cod, Nantucket, Great Island, and Cambridge, Massachusetts, Utah, Carrizo Springs, Texas, and Querataro, Mexico.

There can be no doubt that this is the true *femur-rubrum* of De Geer, since Stål has described the anal cerci of the male from the type of De Geer's description, and I myself made direct comparisons with varied material when in Sweden, nearly thirty years ago.

In Hayden's report on the survey of Nebraska (1872), I collected several accounts, printed and unpublished, of the injury to crops attributed to this species in the eastern United States. As up to that time *M. atlantis* had not been distinguished from *M. femur rubrum*, it is possible, and I am now inclined to think it probable, that all the serious injury done to crops in the East is done by *M. atlantis*; for although almost everywhere less common than *M. femur-rubrum*, *M. atlantis* has been shown to have the capacity for immense multiplication, and has been directly proved to be the culprit in some instances; as it is also much more closely and indeed very closely related to the destructive locust of the West, *M. spretus*, it is far more likely to have been the actual pest in all the records of the past. At least until direct provable charges are made against it, *M. femur-rubrum* should be looked upon as less injurious than *M. atlantis*; it is especially doubtful whether it ever migrates in aerial swarms; as a general rule the tegmina and wings are longer in *M. atlantis* than in *M. femur-rubrum*, though both species vary considerably and intergrade in that particular. From measurements made on Missouri specimens, Riley found that the tegmina in the present species extended beyond the abdomen as follows: In 28 males, 0-2 mm., average, 0.8 mm.; in 54 females, 0-3 mm., average, 1.1 mm.

Bruner excellently expresses the fact when he says that the immediate distribution of this insect "appears to be controlled altogether by climatic conditions, the chief of which is the presence of a certain amount of humidity. . . . It is a frequenter of low grounds, cultivated fields, shady margins of woods, etc., where vegetation is rank and tender." It is rarely found upon dry hillsides when meadows close at hand may swarm with them, while the opposite is true of other species, *M. collinus* for instance; yet such specimens as do so occur will be found to differ from those inhabiting more favored localities, in being lighter colored and more uniformly grayish in tone, with slighter contrasts; those from drier stations appear also to have on the average rather shorter wings.

There is but a single annual brood which begins to appear full fledged in New England late in July. According to Riley, the eggs are not laid in a single mass, but at intervals in several; he has twice obtained four successive pods from a single female, covering a period of nearly two months and containing eggs amounting in all to from ninety-six to one hundred and ten. The eggs have a quadrilinear arrangement in the pods.

At Andover, Massachusetts, on October 5 many years ago I observed a pair of this species, male and female, near together alternately signaling to each other with a slight quick movement of the hind legs upon the tegmina, as if stridulating. I made no note of whether any sound was actually produced and do not now recall any.

Many interesting notes regarding this species will be found in the first report of the United States Entomological Commission.

83. MELANOPLUS PROPINQUUS, new species.

(Plate XVIII, fig. 9.)

Caloptenus femur-rubrum SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1877), p. 86; Ent. Notes, VI (1878), p. 27; Psyche, II (1878), p. 154.

Pezotettix propinquus MCNEILL!, MS.

Of medium size, closely resembling the preceding species in coloration, but generally of a somewhat lighter tint. Head a little prominent, flavo-testaceous, generally more or less infuscated above, with a postocular band; vertex tumid, the interspace between the eyes scarcely broader than (male) or half as broad again as (female) the first antennal joint; fastigium steeply declivent, distinctly (male) or rather shallowly (female) sulcate; frontal costa just failing to reach the clypeus, subequal, of the width of the interspace between the eyes, sulcate at and (especially in the male) below the ocellus, biserially punctate above; eyes moderately prominent in both sexes, much longer, in the female very much longer, than the infraocular portion of the genae; antennae ferruginous, feebly infuscated apically, five-sixths (male) or less than two-thirds (female) as long as the hind femora. Pronotum slightly and regularly enlarging from in front backward, the disk feebly convex and passing into the anteriorly feebly tumid, vertical, lateral lobes by a well-rounded but abrupt shoulder, the disk brownish fuscous, more or less feebly ferruginous, the lateral lobes dull luteo-testaceous, with a broad postocular band on the prozona; median carina slight and percurrent, feebler on the prozona than on the metazona; front margin subtruncate, very faintly flaring at least in the male, hind margin obtusangulate, the angle well rounded; prozona feebly longitudinal (male) or feebly transverse (female), scarcely if any longer than the closely but shallowly punctate metazona. Prosternal spine rather long, suberect, appressed cylindrical, blunt, rather longer and less appressed in the male than in the female; interspace between the mesosternal lobes twice as long (male) or less than half as long

again (female) as broad. Tegmina considerably surpassing the hind femora, rather slender, subequal, brownish fuscous, minutely flecked with fuscous throughout the discoidal area; wings not very broad, hyaline, iridescent, the veins pale fuscous apically and anteriorly. Fore and middle femora a little tumid in the male; hind femora brownish testaceous, more or less infuscated (generally by longitudinal clouds) on the upper half, but on the inner side above bimaculate with blackish fuscous, the geniculation mostly black and with a pregenicular slender black annulus, the under side of the femora flavous inclining to orange; hind tibiae usually bright red with a slight fuscous patellar spot, but sometimes pale yellowish red, or rarely pale yellowish green, the spines black almost to their base, ten to twelve, usually eleven, in number in the outer series. Extremity of male abdomen rather strongly clavate, well recurved, the supraanal plate subclypeate, but very strongly and roundly compressed in the basal half, the apex roundly and rather bluntly rectangulate, the lateral margins strongly and abruptly elevated, the median sulcus deep, percurrent and apically expanded, bounded by rather high but rounded walls; furcula composed of a pair of greatly extended, somewhat depressed, straight fingers, tapering by the narrowing of their inner margins, lying outside the ridges of the supraanal plate, reaching much beyond the middle of the same, and slightly out-curved at their rather blunt tips; cerci rather broad at base, rapidly narrowing beyond so as to be hardly half as wide in the middle, beyond subequal, incurved and blunt-tipped, externally punctate throughout and not reaching the tip of the supraanal plate; subgenital plate hardly half as wide at apex as at base, the lateral margin rapidly declivent, the apical margin not elevated, strongly rounded, entire.

Length of body, male, 21 mm., female, 25 mm.; antennae, male, 10 mm., female, 8.5 mm.; tegmina, male and female, 20 mm.; hind femora, male, 12 mm., female, 13.25 mm.

Seventy-seven males, 87 females. North Carolina, Uhler, Morrison; Dingo Bluff, North Carolina, November 15, Maynard; Smithville, North Carolina, Maynard; Georgia, Morrison (S. Henshaw; S. H. Scudder; U.S.N.M.—Riley collection); Georgia, King (Museum Comparative Zoology); Macon, Bibb County, Georgia, September 18 (U.S.N.M.—Riley collection); Wilmington Island, Georgia, A. Oemler; Florida, Neal (U.S.N.M.—Riley collection); Jacksonville, Duval County, Florida, May 6, J. H. Comstock; Fernandina, Nassau County, Florida, E. Palmer; St. Augustine, St. John County, Florida, E. Palmer; Sanford, Orange County, Florida, G. B. Frazer; Fort Reed, Orange County, Florida, April 8–23, J. H. Comstock; Appalachicola, Franklin County, Florida, R. Thaxter.

This species takes in our Southern Atlantic States the place of *M. femur-rubrum*, which it closely resembles; it is most quickly distinguished from it by the form and sculpture of the supraanal plate and the much greater length of the furcula.

84. MELANOPLUS EXTREMUS.

(Plates I, figs. *f*, *g*; XVIII, fig. 10.)

- ? *Locusta leucostoma* KIRBY, Faun. Bor. Amer., IV (1837), p. 250.—BETHUNE, Can. Ent., VII (1875), p. 129; Ins. Brit. Amer. (1884), pp. 120-121.
- ? *Aeridium (Locusta) leucostomum* DE HAAS, Bijdr. Kenn. Orth. (1842), p. 142.
- Caloptenus extremus* WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 681; Can. Ent., IV (1872), p. 30.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 225.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.—CAULFIELD, Can. Rec. Sc., II (1887), p. 401; Can. Orth. (1887), p. 14.
- Pezotettix junius* DODGE!, Can. Ent., VIII (1876), p. 9.—BRUNER, *ibid.*, IX (1877), p. 144; Rep. U. S. Ent. Comm., III (1883), p. 59.
- Caloptenus parvus* PROVANCHER!, Nat. Canad., VIII (1876), p. 110; Faune Ent. Can., II (1877), p. 36.
- Melanoplus junius* SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1878), p. 286; Ent. Notes, VI (1878), p. 45.—MORSE, Psyche, VI (1892), p. 262.—OSBORN, Proc. Iowa Acad. Sc., I, Pt. II (1892), p. 118.—BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 28.—MORSE, Psyche, VII (1894), p. 106.
- Caloptenus junius* SCUDDER!, Can. Ent., XII (1880), p. 75.
- Melanoplus extremus* CAULFIELD, Rep. Ent. Soc. Ont., XVIII (1886), p. 71.
- Melanoplus parvus* CAULFIELD, Rep. Ent. Soc. Ont., XVIII (1886), p. 71.
- Caloptenus (Melanoplus) parvus* CAULFIELD, Can. Rec. Sc., II (1887), p. 401; Can. Orth. (1887), p. 14.

Of rather small or medium size, brownish fuscous, generally rather dark, often with a ferruginous tinge. Head a little prominent, dark testaceous often somewhat infuscated, above much infuscated, the added infuscation sometimes confined to the fastigium and two divergent, enlarging streaks behind it; vertex gently tumid, feebly elevated above the level of the pronotum, the interspace between the eyes nearly (male) or more than (female) twice as wide as the first antennal joint; fastigium steeply declivent, not very deeply (male) or broadly and very shallowly (female) sulcate throughout; frontal costa failing to reach the clypeus, slightly narrower than the interspace between the eyes, subequal but faintly and very gradually broadening downward, depressed at and sometimes sulcate below the ocellus, biserially punctate; eyes moderately prominent especially in the male, not very large, but little longer than the infraocular portion of the genae; antennae ferruginous, fully four-fifths (male) or from three-fifths to two-thirds (female) as long as the hind femora. Pronotum subequal or enlarging a little on the metazona (in the female throughout), the lateral lobes lighter, sometimes considerably lighter than the disk, with a broad, equal, piceous, postocular band crossing the prozona, the disk often luteo-ferruginous punctate with fuscous, very broadly convex, and passing by an abrupt but smoothed shoulder simulating a lateral carina into the anteriorly tumid vertical lateral lobes; median carina slight, percurrent, distinctly feebler but rarely subobsolete on the prozona; front margin subtruncate with feeblest possible indications of a median emargination, hind margin very obtusangulate, the angle rounded in

the female; prozona distinctly longitudinal (male) or quadrate or transverse (female), distinctly (male) or scarcely (female) longer than the closely punctate metazona, the principal sulcus bent angularly forward slightly in the middle. Prosternal spine moderately long, cylindrical, blunt, erect (male) or short, conical, feebly appressed, blunt, erect (female); interspace between mesosternal lobes quadrate (male) or distinctly transverse but much narrower than the lobes (female). Tegmina either falling distinctly short of the tips of the hind femora, generally about as long as the abdomen in the male, rather broad at base, but rapidly tapering and at apex bluntly subacuminate (*M. e. junius*, Plate I, fig. *g*), or surpassing the hind femora, generally considerably, rather broad, subequal, and at apex rather broadly rounded (*M. e. scandens*, Plate I, fig. *f*), brownish fuscous, generally immaculate, but sometimes with rather a feeble and obscure narrow line of maculation in the discoidal area; wings considerably (*M. e. junius*) or a very little (*M. e. scandens*) shorter than the tegmina, moderately broad, hyaline, with brownish fuscous veins in the anterior half. Fore and middle femora a little tumid in the male; hind femora ferrugineolutescent, the outer face often longitudinally infuscated, the inner side of the upper face bimaculate with fuscous often obscurely, the geniculation blackish and the under surface generally pale orange; hind tibiae bright red, pale red, or pale dull citron, the spines black beyond their base, nine to twelve, usually eleven, in number in the outer series. Extremity of male abdomen clavate, a little recurved, the supraanal plate subtriangular, longer than broad, feebly compressed in the middle, apically slightly acutangulate, the lateral margins elevated basally, the median sulcus moderately deep and narrow, apically expanding and obsolescent, its bounding walls rounded and not very high; furcula consisting of a pair of parallel or subparallel, slender, tapering, acuminate, somewhat depressed spines, somewhat less than half as long as the supraanal plate and resting upon the ridges bordering the median sulcus; cerci feebly subfalcatiform lamellae lying in a slightly oblique vertical plane, a little incurved throughout, feebly tapering in the basal third or more, beyond subequal to the obliquely truncate and well-rounded tip, the whole gently arcuate and much shorter than the supraanal plate; infracercal plates very broad at base, rapidly narrowing and not attaining the tip of the supraanal plate; subgenital plate about half as broad at apex as at base, regularly narrowing by the declivity of the feebly sinuous lateral margin, the apical margin not elevated, well rounded, entire.

Length of body (*M. e. junius*), male, 16 mm., female, 19 mm.; antennae, male, 8 mm., female, 6.75 mm.; tegmina, male, 11 mm., female, 10.75 mm.; hind femora, male, 10 mm., female, 10.75 mm. Length of body (*M. e. scandens*), male, 18 mm., female, 19.5 mm.; antennae, male, 8.75 mm., female, 7 mm.; tegmina, male, 16.25 mm., female, 17.25 mm.; hind femora, male, 10.25 mm., female, 10.5 mm.

Eighty-four males, 131 females. Norway, Oxford County, Maine, August 16 (A. P. Morse); Alpine regions of White Mountains, New Hampshire, Mount Washington and Madison, July, August; Mount Washington 5,000 feet, and Pinkham Notch, New Hampshire, (A. P. Morse); Tuckerman's Ravine, White Mountains, (A. P. Morse); Jackson, Carroll County, New Hampshire, July 3 (A. P. Morse); North Conway, Carroll County, New Hampshire, July 30 (same); Jay, Troy, and Newport, Orleans County, Vermont, July 12-15 (same); Hyde Park, Lamoille County, Vermont, July 20 (same); Montgomery, Franklin County, Vermont, July 18 (same); Summit of Greylock, Berkshire County, Massachusetts, 3,500 feet, August 17 (same); Winchendon, Worcester County, Massachusetts, June 29-July 6 (same); Bloomington, Monroe County, Indiana, Bollman (U.S.N.M.); Chicago, Illinois; Nebraska, Dodge (U.S.N.M.—Riley collection; S. H. Scudder); West Point, Cuming County, Nebraska (L. Bruner); Dallas County, Iowa, August, Allen; Jefferson, Green County, Iowa, July 20-24, Allen; Crawford County, Iowa, prairies, July 13-24, Allen; Denison, Crawford County, Iowa, July 20, Allen; Big Horn Mountains, Wyoming, 8,000 to 9,000 feet (L. Bruner); Arctic America, Kennicott; Great Bear Lake, Kennicott; Upper Mackenzie River, Kennicott; Yukon River, at mouth of Porcupine River, Alaska, Kennicott; Banff, Alberta, Bean (S. Henshaw).

It has also been reported from Quebec (Provancher, Scudder) Dodge County, Nebraska (Dodge), and the Mackenzie River, British America, at latitude 65° (Kirby); the last, however, is uncertain, depending on the determination of Kirby's species. It probably occurs throughout the larger part of Canada and the northernmost United States.

As indicated in the description, this insect appears in two forms: a short winged (*M. e. junius*), in which the tegmina at rest do not reach the tips of the hind femora; and a long-winged (for which I propose the name *M. e. scandens*), in which they surpass them, generally considerably. The latter has also a slightly slenderer body, though the difference is not marked. It appears to affect high latitudes and altitudes, being found in all the localities in the high north where Kennicott collected, on the Big Horn Mountains in Wyoming, and on the summits of Greylock in Massachusetts, and the White Mountains in New Hampshire, in all of which (unless in Wyoming, whence I have only seen two specimens) it is the prevailing or exclusive form. The short-winged form, however, occurs in all these places excepting the Alpine region of the White Mountains, where it has not been taken; and the long winged occurs also at lower levels in New England, as at North Conway, New Hampshire, Jay and Montgomery, Vermont, and Winchendon, Massachusetts, but it is only found in these places exceptionally, to judge from the specimens seen. The two specimens from the Big Horn Mountains, the male *scandens*, the female *junius*, are of exceptional size, and Arctic American specimens are also distinctly larger than those from New England or Nebraska.

It will probably be impossible ever to determine definitely Kirby's *Locusta leucostoma*, as the description is altogether inadequate and the British Museum does not contain the type; at least I could not find it by special search for it in 1865, and it is not mentioned in Walker's catalogues; Walker, following my earlier but probably wrong determination, placed it as a synonym of *M. bivittatus*, but none of his specimens included Kirby's.

Mr. Samuel Henshaw, during a recent visit to the British Museum, examined the types of Walker's *Caloptenus extremus* and found them to agree with specimens of the present species coming from Kennicott's collection on the upper Mackenzie, which he took with him; they differed "only in having slightly shorter wings," in which respect Walker's specimens agree with others of Kennicott's collection belonging to this species.

85. MELANOPLUS MONTICOLA, new species.

(Plate XIX, fig. 5.)

Platyphyma montana SCUDDER!, Appal., I (1878), p. 263.

Melanoplus monticola BRUNER!, MS. (pars).

Rather below the medium size, blackish fuscous. Head feebly prominent, dark testaceous, greatly infuscated especially in the female, above wholly or almost wholly blackish fuscous, the piceous postocular band hardly distinguishable in darkest examples; vertex gently tumid, a little elevated above the pronotum, the interspace between the eyes half as broad again (male) or more than twice as broad (female) as the first antennal joint; frontal costa rather prominent, percurrent, equal, as broad as the interspace between the eyes, impressed at the ocellus and sometimes sulcate below, punctate throughout, above biserially; eyes not prominent, of moderate size, as long as (female) or much longer than (male) the infraocular portion of the genae; antennae castaneous, apically infuscated, nearly four-fifths (male) or nearly three-fifths (female) as long as the hind femora. Pronotum enlarging slightly and pretty regularly from in front backward, wholly blackish fuscous, more or less ferruginous in the male, occasionally the position of the lateral carinae faintly marked on the prozona with dull flavous, sometimes the lateral lobes a little lighter inferiorly and then showing a piceous postocular band on the prozona, the disk gently convex and passing by an abruptly rounded shoulder sometimes forming feeble lateral carinae into the anteriorly tumid but otherwise vertical lateral lobes; median carina percurrent, feebler and sometimes subobsolete on the prozona; front margin truncate, hind margin strongly obtusangulate; prozona longitudinal (male) or quadrate or feebly transverse (female), generally slightly longer than the closely and shallowly punctate metazona. Prosternal spine short (female) or rather short (male), appressed cylindrical, very blunt, erect; interspace between mesosternal lobes quadrate (male) or feebly transverse (female), the metasternal

lobes rather approximate (male) or moderately distant (female). Tegmina failing a little (male) or considerably (female) of reaching the tips of the hind femora, moderately broad, distinctly tapering, strongly rounded at apex, fusco-ferruginous, immaculate; wings not broad, impure hyaline with reddish fuscous veins. Fore and middle femora considerably tumid in the male; hind femora varying from dark testaceous to dark plumbeo-fuscous, the inner half of the upper face dull flavous, with the base, geniculation, and two large intermediate spots black, the under surface deep red; hind tibiae deep red, often much infuscated but then with a narrow, red, subbasal annulus, the spines black throughout, eleven to twelve, usually eleven, in number in the outer series. Extremity of male abdomen strongly clavate, somewhat recurved, the supraanal plate long clypeate, with sides strongly compressed in the middle, the lateral margins strongly elevated, the apex acutangulate, the median sulcus very narrow and deep, being a mere slit between moderately high but rounded walls, apically obsolete; furcula consisting of a pair of basally attingent, basally expanded, and depressed fingers, which beyond are straight, parallel, acuminate thorns, more than a third as long as the supraanal plate and overlying its ridges; cerci coarse and heavy subfalceiform laminae, their plane obliquely vertical and nearly straight, considerably shorter than the supraanal plate, tapering considerably on the basal half, feebly on the apical half, which is considerably more than half as broad as the extreme base, obliquely truncate at apex, the upper angle very blunt; subgenital plate narrowing from base to apex, somewhat longer than broad, the lateral margins gently sinuate, the apical margin elevated by slight tubercles at its somewhat angular junction with the lateral margins, so that it is broadly notched, as viewed posteriorly.

Length of body, male, 17.5 mm., female, 23 mm.; antennae, male, 8.25 mm., female, 6.75 mm.; tegmina, male, 12.25 mm., female, 11.5 mm.; hind femora, male, 10.5 mm. female, 11.5 mm.

Two males, 2 females. Above timber line on Sierra Blanca, Colorado, 12,000 to 13,000 feet (S. H. Scudder; L. Bruner). All the specimens, besides two pupae, taken by me August 29, 1877.

The species is very closely allied to the last, but differs from it distinctly in the character of the subgenital plate.

20. CINEREUS SERIES.

In this more than usually homogeneous group, the male prozona is quadrate or slightly longitudinal, and the interspace between the mesosternal lobes of the same sex varies from a little longer than broad to twice as long as broad. The tegmina are always fully developed, surpassing somewhat the hind femora, and at most are feebly maculate, the flecking not always confined closely to the discoidal area. The hind tibiae are blue or green (in one instance apparently reddish yellow) and have ten to twelve spines in the outer series.

The supraanal plate is generally rather simple, triangular with convex sides and a generally produced apex, but is sometimes strongly and abruptly compressed apically. The furcula is developed to an extreme as a pair of parallel, flattened, pointed plates, usually more than half as long as the supraanal plate. The cerci are rather slender or only moderately broad, apically spatulate or subs spatulate, incurved or inbent, of variable length relative to the supraanal plate. The subgenital plate is moderately broad apically, but distinctly narrower than long, the apical margin entire and not elevated, or only slightly elevated.

The species, six in number, are of medium or slightly above the medium size and with the exception of the typical species are found only in the extreme Southwestern States—Southern California, Arizona, and Texas, and in Lower California and Sonora, but the typical species extends the range on the north to Washington, Idaho, and Wyoming, and eastward to Louisiana and western Nebraska. It is a western type.

86. *MELANOPLUS BISPINOSUS*, new species.

(Plate XIX, fig. 6.)

Cinereo-fuscous, more or less ferruginous. Head slightly prominent in the male only, warm testaceous, infuscated above, with a postocular piceous band; vertex gently tumid, raised but slightly above the level of the pronotum, the interspace between the eyes rather broad, much broader than (male) or fully twice as broad as (female) the first antennal joint; fastigium steeply declivent and plane (female) or broadly and shallowly sulcate (male); frontal costa fading next the clypeus, a little narrowed above, but otherwise fully as broad as (male) or slightly narrower than (female) the interspace between the eyes, feebly sulcate at and below the ocellus, biserially punctate above; eyes rather large, somewhat prominent, a little longer than the infraocular portion of the genae; antennae ferruginous, apically infuscated, in the male more than four-fifths as long as the hind femora. Pronotum subequal, but with distinctly flaring metazona, the feebly convex disk passing by a broad angle into the subvertical and feebly tumid lateral lobes, leaving no trace of lateral carinae except slightly on the metazona; lateral lobes with a distinct though sometimes broken broad piceous band crossing the upper part of the prozona, broadest on its posterior lobe; median carina distinct on the metazona, inconspicuous and blunt (male) or subobsolete (female) on the prozona; front margin truncate, hind margin obtusangulate, the angle well rounded; prozona quadrate, only a little longer than the finely punctate metazona. Prosternal spine moderately long, stout, cylindrical, very blunt, erect; interspace between mesosternal lobes fully twice as long as broad (male) or subquadrate (female). Tegmina surpassing the hind femora, of moderate width, gently tapering, apically well rounded, fusco-testaceous more or less ferruginous basally, flecked somewhat obscurely with fuscous and

cinereous in the discoidal area, and often very feebly dotted with obscure fuscous outside of it; wings hyaline, the apical and anterior veins testaceous. Hind femora luteo-ferruginous, obliquely bifasciate on the upper half with brownish or blackish fuscous, and with a small basal spot of the same, the genicular arc black, but the inferior genicular lobe light colored with only a basal fleck of fuscous; under half luteous or rosaceous, externally more pallid than the rest; hind tibiae dull green becoming lutescent at the extremities, with a more or less obscure fuscous postbasal annulus, the spines black beyond their pallid base, eleven to twelve in number in the outer series. Extremity of male abdomen clavate, somewhat upturned, the supraanal plate strongly compressed apically so as to give the sides a very tortuous course and so as to be composed of two parts: the larger basal part nearly plane, broader than long, longer laterally than mesially, the immediate margins elevated slightly and a little overhanging by expansion, the median sulcus moderately deep and not broad, uniform; and an apical narrow triangular tip with strongly elevated margins forming the sides of the very deep median sulcus, fully two-thirds as long as the basal portion, the tip strongly acutangulate but blunt; furcula consisting of a pair of parallel, flattened, regularly tapering, rather bluntly acuminate fingers, except at extreme base lying wholly outside the median sulcus, nearly half as long as the entire plate; cerci slender, regularly and considerably incurved throughout, narrowing gently and then as gently enlarging to a regular and rounded spatulate tip not quite so wide as the extreme base, the whole fully five times as long as the narrowest breadth and reaching to about halfway between the lateral angle and the tip of the supraanal plate; infracercal plates slightly shorter than the supraanal; subgenital plate haustate, moderately broad but considerably longer than broad, of subequal breadth, but the lateral margins slightly and roundly elevated at base, and the apical margin feebly elevated, well rounded, entire.

Length of body male, 24.5 mm., female, 31.5 mm.; antennae, male (estimated), 12 mm.; tegmina, male, 21.5 mm., female, 23 mm.; hind femora, male, 14.5 mm., female, 16 mm.

Three males, two females. Texas, Schaupp (S. Henshaw); Tiger Mill, Burnet County, Texas (L. Bruner); San Antonio, Bexar County, Texas, M. Newell (L. Bruner).

The name is given from the prominence of the furcula.

87. *MELANOPLUS TERMINALIS*. new species.

(Plate XIX, fig. 7.)

Brownish fuscous, more or less ferruginous. Head hardly prominent, lighter or darker castaneous, often much flecked with fuscous, the mouthparts paler, above darker being much infuscated, and especially the lateral margins of the fastigium are marked in black, and there is a piceous postocular band often streaked with testaceous; vertex gently

tumid, slightly elevated above the pronotum, the interspace between the eyes not broad, but much broader than the first antennal joint; fastigium very steeply declivent, deeply sulcate throughout; frontal costa failing to reach the clypeus, slightly contracted above, elsewhere fully as broad as, if not broader than, the interspace between the eyes, sulcate at and below the ocellus, biserially punctate above; antennae luteo-ferruginous, nowhere infuscated, except sometimes at extreme tip, about three-fourths as long as the hind femora. Pronotum subequal, scarcely expanding on the metazona, the lateral lobes with a somewhat obscure, piceous band, crossing the prozona above; disk feebly convex, passing by a rounded shoulder, becoming almost a lateral carina on the metazona, into the tumid, vertical, lateral lobes; median carina distinct on the metazona, feeble and blunt on the prozona; front margin feebly convex, hind margin almost rectangulate; prozona quadrate or feebly longitudinal, scarcely or slightly longer than the densely punctate metazona. Prosternal spine rather long, erect, cylindrical, rather blunt; interspace between mesosternal lobes about half as long again as broad. Tegmina surpassing the hind femora, rather slender, gently tapering, well rounded apically, brownish fuscous, with very slight, obscure signs of sparse maculation in the discoidal area; wings hyaline, with the anterior and apical veins testaceous. Hind femora ferruginous or luteo-ferruginous, sometimes with an olivaceous tinge, bifasciate above with blackish fuscous, generally obscurely, and with a basal spot of the same, the under surface luteous or ferruginous, the genicular arc black; hind tibiae pale glaucous green, a little pallid at the base, with an obscure, fuscous, post-basal annulus, the spines black beyond their pallid base, eleven in number in the outer series. Extremity of male abdomen clavate, somewhat upturned, the supraanal plate and furcula as in *M. bispinosus*; cerci also shaped as there, but smaller and slenderer, fully six times as long as the narrowest breadth; subgenital plate narrowing regularly from base to apex, much longer than broad, subconical, the apical margin with a hardly perceptible elevation, entire, as viewed from above acutangulate, the angle blunt and a little thickened.

Length of body, male, 21 mm.; antennae, 9 mm.; tegmina, 17.5 mm.; hind femora, 12.25 mm.

Five males. Gulf coast of Texas, Aaron; Carrizo Springs, Dimmit County, Texas, Wadgymer, November (L. Bruner).

This species is exceedingly close to *M. bispinosus*, but is smaller, darker, a more southern form, and differs by its slightly smaller and slenderer cerci, the general characters of the subgenital plate and in minor peculiarities of its structure. It can be confounded with no other species.

88. MELANOPLUS CYANIPES, new species.

(Plate XIX, fig. 8.)

Melanoplus cyanipes BRUNER¹, MS.—COQUILLET, Ins. Life, I (1889), p. 227.—
BRUNER, Rep. St. Hort. Soc. Nebr., 1894 (1894), p. 163—undescribed.

Varying from light ferrugineo-testaceous through cinereo-fuscous to dark brownish fuscous with a ferruginous tinge, thinly pilose. Head slightly prominent, plumbeo-testaceous, more or less infuscated, sometimes flecked profusely and minutely with fuscous, above darker and generally more uniform than elsewhere, often blackish fuscous, with a postocular piceous band; vertex gently tumid, slightly elevated above the pronotum, the interspace between the eyes moderate, a little broader than (male) or twice as broad as (female) the first antennal joint; fastigium rather strongly declivent, sulcate throughout; frontal costa rather prominent above, but not contracted, just failing to reach the clypeus, feebly broadening below, fully as broad as the interspace between the eyes, shallowly sulcate at and generally below the ocellus, punctate above; eyes large, prominent, particularly in the male where they rise above the level of the vertex, very much longer than the infraocular portion of the genae; antennae luteo-fulvous, four-fifths (male) or about two-thirds (female) as long as the hind femora. Pronotum subequal, scarcely enlarging on the metazona, the very gently convex disk passing, with a pronounced but well-rounded shoulder, nowhere forming a lateral carina, into the inferiorly vertical lateral lobes; the latter are marked above with a broad, equal, rarely broken, piceous band crossing the prozona and sometimes indicated on the metazona by a slight darkening; median carina distinct on the metazona, obsolete or subobsolete on the prozona, always obsolete between the sulci; front margin truncate; hind margin broadly obtusangulate, the angle generally broadly rounded in the female; prozona quadrate or feebly longitudinal (male) or quadrate or feebly transverse (female), only a little longer than the closely punctate metazona. Prosternal spine short, conical, very blunt, erect; interspace between mesosternal lobes twice as long as broad (male) or considerably longer than broad (female). Pleura with a distinct flavo-testaceous stripe bordered with black following the metathoracic episterna. Tegmina surpassing the hind femora, sometimes considerably, slender, tapering feebly, well rounded apically, brownish fuscous, sometimes immaculate but generally rather sparsely sprinkled with minute fuscous spots throughout the discoidal area almost or quite to the tip; wings rather narrow, hyaline, often with a very feeble citron tint, most of the veins black or fuscous. Fore and middle femora but little tumescent in the male; hind femora slender and elongate, testaceous or ferruginous, obscurely bifasciate with fuscous, often reduced to a fuscous cloud on the outer face, most of the geniculation black, the inferior surface and most of the interior varying from luteous to carmine; hind tibiae light green or glaucous, sometimes blue, with a postbasal fuscous spot or annulus, clothed with sparse pile twice as long as the spines, the spines pallid in basal, black

in apical half, ten to eleven in number in the outer series. Extremity of male abdomen a little clavate, a little upturned, the supraanal plate long triangular, the sides bent a little beyond the middle, before which they are broadly elevated a little, the apex acutangulate, the surface more than usually plane, the median sulcus slight and hardly perceptible except apically; furcula consisting of a pair of large, broad, greatly flattened, parallel, strongly and rather regularly tapering and acuminate fingers, reaching more than halfway across the supraanal plate; cerci elongate, compressed, rather slender, subequal laminae, a little obliquely vertical at the base, in the middle bent abruptly inward and then at once again backward, but here completely vertical by a slight twist in the bend, the apex roundly truncate, the basal half gradually tapering and beyond again enlarging to somewhat less than the basal width, the whole extending to the tip of the supraanal plate; infracercal plates broad and subtruncate apically, just shorter than the supraanal plate; subgenital plate broad, but a little longer than broad, flaring, the apical margin scarcely elevated, thickened, entire, as viewed from above strongly rounded.

Length of body, male, 21.5 mm., female, 23.5 mm.; antennae, male, 9.5 mm., female, 9 mm.; tegmina, male, 17 mm., female, 19 mm.; hind femora, male, 11.5 mm., female, 14.5 mm.

Fifteen males, 9 females. California (U.S.N.M.—Riley collection); California, H. Edwards (Museum Comparative Zoology); Los Angeles, California, July, Coquillett (U.S.N.M.; L. Bruner); Pasadena, Los Angeles County, California, October 23; San Diego, California, October 26.

This species is certainly very closely allied in structure to the next, *M. cinereus*, and may prove to be a variety of it, found in different stations. It wholly lacks, however, the cinereous speckling so characteristic of typical examples of the latter species, with the rusty hue of the pronotum.

Some individuals are much smaller than, hardly more than half as large as, others; the measurements are taken from the larger and apparently commoner forms.

89. MELANOPLUS CINEREUS.

(Plate XIX, fig. 9.)

Melanoplus cinereus SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1878), pp. 288, 290; Ent. Notes, VI (1878), pp. 47, 49; Rep. U. S. Ent. Comm., II (1880), App., p. 24, pl. XVII, figs. 1, 4, 5.—BRUNER, *ibid.*, III (1883), p. 60; Bull. Div. Ent. U. S. Dep. Agric., IV (1864), p. 58; Can. Ent., XVII (1885), p. 17; Rep. U. S. Ent., 1885 (1886), p. 307.—COQUILLET, *ibid.*, 1885 (1886), pp. 291-293, 295, 297.—KOEBELE, Bull. Div. Ent. U. S. Dep. Agric., XXII (1890), p. 94.—RILEY, *Ins. Life*, II (1889), p. 27.—BRUNER, *Publ. Nebr. Acad. Sc.*, II (1893), p. 28; Rep. Nebr. St. Bd. Agric., 1893 (1893), p. 460; Rep. St. Hort. Soc. Nebr., 1894 (1894), p. 163; *ibid.*, 1895 (1895), p. 69.

Caloptenus cinereus RILEY, *Stand. Nat. Hist.*, II (1884), p. 195.—MILLIKEN, *Ins. Life*, VI (1893), p. 19.

Cinereo-fuscous, the upper surface of head and pronotum frequently rust-colored. Head somewhat prominent, dull pale testaceous, flecked

above with fuscous in a pair of parallel longitudinal streaks; vertex moderately tumid, somewhat elevated above the pronotum, the interspace between the eyes not very broad, a little broader than (male) or half as broad again as (female) the first antennal joint; fastigium moderately declivent, sulcate broadly throughout, more deeply in the male than in the female; frontal costa rather prominent above, equal, just failing to reach the clypeus, as broad as the interspace between the eyes, feebly sulcate at and below the ocellus, biserially punctate above; eyes large, moderately prominent, very much longer than the infraocular portion of the genae; antennae luteous or fulvous, almost as long (male) or fully two-thirds as long (female) as the hind femora. Pronotum subequal, feebly expanding on the metazona, the disk feebly convex and passing, by a broadly rounded shoulder occasionally feebly indicating a lateral carina, into the vertical lateral lobes, which are marked above on the prozona by an often partially broken piceous band, followed beneath by irregular quadrate patches of sallow luteous; median carina distinct on the metazona, almost or quite obsolete on the prozona; front margin truncate, hind margin slightly obtusangulate; prozona longitudinal (male) or quadrate (female), scarcely if any longer than the rather closely-punctate metazona. Prosternal line short, conico-cylindrical, blunt, erect; interspace between mesoanal lobes more than twice as long as broad (male) or a little longer than broad (female). Tegmina surpassing, generally to a considerable degree, the hind femora, slender, gently tapering, apically well rounded, brownish fuscous, finely speckled throughout with cinereous and with a slender line of alternate pale and dark bars and dots in the discoidal area and sometimes a second line along the upper edge of the anal area; wings ample, very delicate, glistening hyaline with glauco-fuscous veins. Fore and middle femora somewhat tumescent in the male, all the femora luteo ferruginous flecked with fuscous, the hind pair bifasciate with fuscous, which is transverse on the upper face, very oblique and confined to the upper half on the outer face, the lower face a little ruddy; hind tibiae pale blue, rarely with a luteous tinge, the spines pallid in their basal, black in their apical half, ten to twelve, usually ten, in number in the outer series. Extremity of male abdomen considerably clavate, well rounded, not greatly recurved, the supraanal plate rather long triangular with feebly acutangulate apex and scarcely elevated lateral margins, nearly plane, feebly depressed, the median sulcus only apparent at tip where it passes between two slight lateral bosses; forceps consisting of a pair of basally adjacent, very broad, flattened, tapering fingers, apically produced as slender aciculate extensions, reaching fully three-fourths of the way across the supraanal plate; cerci moderately narrow, basally tapering, compressed laminae, which at the middle are abruptly bent inward at right angles but with a rounded curve, and then bent at extreme tip backward again, all the while broadening feebly, the whole outer side of the bent portion broadly

suiccate, the apex roundly truncate, sometimes feebly and roundly emarginate, the lower apical angle usually a little produced, giving the whole, which reaches nearly to the tip of the supraanal plate, a twisted appearance; infracercal plates broad, apically rounded, as long as the supraanal plate; subgenital plate of subequal breadth, narrowing a little apically, longer than broad, slightly flaring, the lateral and apical margins in the same plane, except that the latter, which is well rounded and entire, is feebly elevated at the extreme apex.

Length of body, male, 23 mm., female, 26 mm.; antennae, male, 11 mm., female, 9.75 mm.; tegmina, male, 19 mm., female, 20.5 mm.; hind femora, male, 12.5 mm., female, 14 mm.

Thirty males, 57 females. Wallula, Wallawalla County, Washington, September 1, Packard (U.S.N.M.—Riley collection; S. H. Scudder); Lone Tree, Yakima River, Washington, July 18, S. Henshaw (Museum Comparative Zoology); Salmon City, Lemhi County, Idaho (U.S.N.M.—Riley collection; L. Bruner); Wyoming, Morrison (U.S.N.M.—Riley collection); California (same); California, H. Edwards; Sierra County, California, J. G. Lemmon (U.S.N.M.—Riley collection); Los Angeles County, California, August (same); Salt Lake Valley, Utah, 4,300 feet, August 1–4; American Fork Canyon, Utah County, Utah, 9,500 feet, August 2–3; Fort Grant, Graham County, Arizona (U.S.N.M.—Riley collection); Albuquerque, Bernalillo County, Arizona (same); Texas, Belfrage (same); Pecos River, Texas, July, Captam Pope; Baton Rouge, Louisiana, June 8, F. J. Bird (U.S.N.M.—Riley collection).

It has also been reported from the Yellowstone region and Sioux County, Nebraska (Bruner), Reno, Washoe County, Nevada (Scudder), and the San Joaquin Valley, California (Coquillett).

I have found this insect only upon the sage brush (*Artemisia*), and so completely do its gray and rusty colors harmonize with its surroundings that it is extremely difficult to detect when at rest. This has also been noticed by Bruner, who remarks that the resemblance extends to the earlier stages of the insect.

Coquillett remarks upon the ease of its flight, describing it as in a straight line, for a distance of from 5 to 20 feet from the ground. He found it devouring the ripe kernels of rye in California, and Riley reports it as injuring cotton in Louisiana. Coquillett regards it as a migrating species, but his specific statements refer only to short flights from the fields to the tree tops or the reverse, fifty to one hundred yards being the usual distance. In the San Joaquin Valley he found specimens pairing at the last of July.

90. *MELANOPLUS COMPLANATIPES*, new species.

(Plate XIX, fig. 10.)

Nearly uniform light testaceous. Head slightly prominent in the male, hardly darker above than elsewhere, with no trace or but feeblest trace of any postocular band; vertex very gently tumid, hardly elevated

above the pronotum even in the male, the interspace between the eyes rather narrow, scarcely wider than (male) or about half as wide again as (female) the first antennal joint; fastigium rapidly declivent, sulcate throughout; frontal costa percurrent, subequal, not contracted above, as wide as the interspace between the eyes, sulcate at and below the ocellus, biserially sulcate above; eyes pretty large, rather prominent, much longer than the infraocular portion of the genae; antennae testaceous, almost as long (male) or about two-thirds as long (female) as the hind femora. Pronotum equal on the prozona, expanding a little and gradually on the metazona, more in the female than in the male, the disk feebly convex and passing by a strongly rounded shoulder (the shoulder hardly noticeable on the prozona) into the vertical lateral lobes, which have feeble and broken or no indications of a fuscous band on the upper part of the prozona; median carina distinct on the metazona, quite or almost wholly obsolete on the prozona; front margin faintly convex, hind margin obtusangulate, prozona quadrate in the male, transverse or quadrate in the female, feebly emarginate in the middle posteriorly, scarcely or no longer than the metazona. Prosternal spine short, conical, blunt, erect; interspace between mesosternal lobes much more than twice as long (male) or half as long again (female) as broad. Tegmina much surpassing the hind femora, exceptionally slender, scarcely tapering, apically well rounded, testaceous with a mesial line of exceedingly feeble and sparse fuscous spots; wings narrow and pointed, hyaline with light testaceous veins and with scarcely perceptible infumation at the extreme tip. Hind femora strongly compressed, the outer face so flattened as hardly to show any convexity, testaceous, immaculate, the outer face sometimes feebly infuscated, the genicular are fuscous; hind tibiae luteo-testaceous, the spines black on apical half, ten to eleven, usually ten, in number in the outer series. Extremity of male abdomen clavate, a little upturned, the supraanal plate long triangular, rather strongly contracted just beyond the base, the lateral margins narrowly elevated, the apex acutangulate, the median sulcus consisting of a basal triangular portion, beyond which it is interrupted and again appears apically as a channel between two lateral bosses; furcula consisting of a pair of basally attingent, broad, flattened plates which taper very rapidly and then are continued as cylindrical, parallel needles, reaching at least two-thirds way across the supraanal plate; cerci slender, mesially contracted, apically spatulate, compressed laminae, as viewed laterally straight, as viewed from above apically incurved and then feebly returning to their original direction at extreme tip and there externally sulcate, the whole almost reaching the tip of the supraanal plate, and the apex as broad as the base; infracercal plates well rounded apically, slightly longer than the supraanal plate; subgenital plate much longer than broad, of moderate breadth, a little broader basally than apically, the apical margin slightly and gradually elevated, well rounded, entire. (The drawing is made from a specimen somewhat distorted by preservation in spirits.)

Length of body, male, 15.25 mm., female, 23 mm.; antennae, male, 10 mm., female, 8.5 mm.; tegmina, male, 19.5 mm., female, 20.5 mm.; hind femora, male, 11 mm., female, 12.25 mm.

Two males, 3 females. Cape St. Lucas, Lower California, J. Xantus; Sonora, Mexico, C. A. Schott.

91. *MELANOPLUS CANONICUS*, new species.

(Plate XX, fig. 1.)

Luteo-testaceous with a distinct ferruginous tinge. Head a little prominent, flavo-luteous, below with a slight olivaceous tinge, above a little streaked with fuscous and, in the male at least, with a dark fuscous postocular band; vertex a little tumid, a little elevated above the pronotum, the interspace between the eyes rather narrow, equal to (male) or a little exceeding (female) the width of the basal antennal joint; fastigium rather strongly declivent, deeply (male) or shallowly (female) sulcate throughout; frontal costa rather prominent above, straight on a side view, just failing to reach the clypeus, equal, a little broader than the interspace between the eyes, feebly sulcate at and below the ocellus, punctate above, biserially in the male; eyes pretty large, rather prominent in the male, distinctly longer than the infra-ocular portion of the genae; antennae luteous, as long as the hind femora in the male. Pronotum subequal, feebly expanding on the metazona, the disk feebly convex and passing by a broadly rounded shoulder into the subvertical lateral lobes, which in the male are marked on the upper half of the prozona by a slightly mottled, glistening, brownish fuscous band; median carina distinct on the metazona, obsolete on the prozona; front margin subtruncate, hind margin obtusangulate; prozona feebly longitudinal (male) or quadrate (female), slightly longer than the closely punctate metazona. Prosternal spine rather short, conical, erect, anteriorly appressed; interspace between mesosternal lobes more than twice (male) or nearly twice (female) as long as broad. Tegmina a little surpassing the hind femora, moderately slender, gently tapering, brownish fuscous, sometimes with a ferruginous tinge, more or less feebly flecked with obscure maculae in the discoidal area; wings pellucid, very faintly infumated, the veins black or blackish fuscous. Fore and middle femora of male feebly tumescent; hind femora luteo-testaceous, bifasciate with pale fusco ferruginous above, the outer face feebly infuscated, the lower face luteous, the genicular arc blackish fuscous; hind tibiae very pale glaucous, pallescent basally, the spines black in their apical half, ten to twelve in number in the outer series. Extremity of male abdomen a little clavate and recurved, the supraanal plate longer than broad, tapering at first slightly then rapidly, the apex obtusangulate except for a slight production, the surface nearly plane, the median sulcus slight and inconspicuous; furcula consisting of a pair of adjacent flattened plates, very broad on basal third, then rapidly contracted, and continuing on

apical third as parallel, cylindrical but tapering, acuminate needles, reaching to the distal end of the middle third of the supraanal plate; cerci slender feebly compressed laminae, rapidly narrowing on basal third, the middle third equal, hardly compressed and half as broad as extreme base, then expanding to a nearly equal extent to form a compressed, spatulate, incurved tip, the apical portion of which is very strongly compressed and not incurved; infracercal plates broadly rounded apically, as long as the supraanal plate; subgenital plate moderately broad, subequal in breadth, considerably longer than broad, feebly flaring, the apical margin very broadly and feebly elevated, well rounded but feebly angulate, entire.

Length of body, male, 25 mm., female, 28 mm.; antennae, male, 12.5 mm.; tegmina, male, 19? mm., female, 21 mm.; hind femora, male, 12.75 mm., female, 14.25 mm.

One male, 1 female. Grand Canyon of the Colorado, Arizona, July 10 (L. Bruner).

This species is rather closely allied to the last, *M. complanatipes*, but is easily distinguished from it by its less strongly compressed hind femora with their bifasciate markings. The differences in the abdominal appendages are slight, but are found at every point.

21. ANGUSTIPENNIS SERIES.

A very homogeneous group (and one very closely allied to the preceding), in which the prozona of the male is variable, and the interval between the mesosternal lobes in the same sex varies from a little longer to several times longer than broad. The tegmina are always fully developed and reach or somewhat surpass the tips of the hind femora. The hind tibiae are red or glaucous and have from nine to thirteen spines in the outer series.

The supraanal plate is long and rounded triangular, and preapically contracted somewhat conspicuously. The furcula consists of a pair of slender, tapering, acuminate fingers of considerable length, generally extending over a third of the supraanal plate. The cerci are rather short and rather slender, incurved or inbent apically, spatulate, not nearly reaching the tip of the supraanal plate. The subgenital plate is large, fully as broad as long, not or but little elevated apically and there usually feebly notched.

The species, only four in number, are of medium or rather small, occasionally rather large size, and occur from Iowa to Utah, and from Montana and Manitoba to Texas, though one species ranges as far east as Sudbury, Ontario—the only one found east of the Mississippi. They occur mostly in the region between the Rocky Mountains and the Mississippi.

92. MELANOPLUS COMPTUS, new species.

(Plate XX, fig. 2.)

Of small size and brownish fuscous color. Head dull brownish luteous somewhat uniformly infumated, above much infuscated with only a feeble mottling of luteous; vertex feebly tumid, only slightly elevated above the level of the pronotum, the interspace between the eyes as broad as the first antennal joint; fastigium strongly declivent, rather deeply sulcate throughout; frontal costa equal, as broad as the interspace between the eyes, shallowly sulcate at and below the ocellus, biserially punctate; eyes rather large and prominent, much longer than the infraocular portion of the genae; antennae fulvous, more than three-fourths as long as the hind femora. Pronotum brownish fuscous above, luteo-testaceous on lateral lobes, the latter marked above on the prozona by a broad dull piceous stripe sometimes tinged with smoky olivaceous; disk scarcely expanding on the metazona, very badly convex and passing into the inferiorly vertical lateral lobes by a well rounded shoulder nowhere forming distinct lateral carinae; median carina obsolete on the prozona; front margin transverse, almost imperceptibly emarginate in the middle, hind margin obtusangulate, the angle rounded; prozona subquadrate or feebly longitudinal, distinctly longer than the closely punctate metazona. Prosternal spine short, conico-cylindrical, compressed, erect, very blunt; interspace between mesosternal lobes of male at least three times as long as broad, the metasternal lobes attinent for some distance. Tegmina brownish fuscous, immaculate or very obscurely and feebly maculate in the discoidal area, slender, subequal, scarcely expanded on the costa, surpassing a little the hind femora; wings rather narrow, pellucid, glistening, the veins pale blue on the lower, fuscous or blackish on the upper half. Fore and middle femora but little tumid, luteo-testaceous blotched with fuscous; hind femora luteo-ferruginous, obscured with fuscous above and on outer face, above interruptedly, so as to cause feeble signs of dusky fasciation, beneath chrome yellow, the genicular arc dull luteous, edged only with fuscous; hind tibiae red, narrowly pallid at extreme base, the spines black on apical half, ten to eleven in number in the outer series. Extremity of male abdomen a little clavate, somewhat upturned, the supraanal plate long triangular, the basal three-fifths with well rounded uptilted sides, beyond which the plate is laterally notched and contracted, the apex produced and very acutangulate, the tip blunt, the median sulcus broad and not very deep, terminating with the basal portion; furcula consisting of a pair of depressed, uniformly tapering, acuminate, slightly divergent fingers less than a third as long as the supraanal plate; cerci rather short and not very broad, regularly spatulate by the regular, slight and gradual mesial contraction, the apical half rather strongly incurved, externally hollowed, the apex well

rounded, not nearly reaching the tip of the supraanal plate; infracercal plates well developed, laterally twice as broad as the cerci, well rounded, distinctly shorter than the supraanal plate; subgenital plate scoop-shaped, but slightly angulate behind laterally, the apical margin scarcely elevated and most feebly notched.

Length of body, male, 19 mm.; antennae, 9 mm.; tegmina, 15.75 mm.; hind femora, 11.25 mm.

Two males. Northern Minnesota; Sidney, Cheyenne County, Nebraska, August 25 (L. Bruner).

93. MELANOPLUS COCCINEIPES, new species.

(Plate XX, figs. 3-5.)

Caloptenus minor SCUDDER!, Bull. U. S. Geol. Surv. Terr., II (1876), p. 261.

Melanoplus devastator SCUDDER! (pars), Proc. Bost. Soc. Nat. Hist., XIX (1878), pp. 285-286, 287-288; (pars), Ent. Notes, VI (1878), pp. 46-47, 48-49.

Of medium or small size, dark fuscous, often with a ferruginous tinge. Head slightly prominent, luteo-testaceous, sometimes flecked or irrorate with fuscous on the face, above much infuscated often with a ferruginous tinge, and a more or less distinct piceous or subpiceous postocular stripe; vertex gently tumid, raised a little above the level of the pronotum, the interspace between the eyes moderately broad, half as broad again (male) or twice as broad (female) as the first antennal joint; fastigium rapidly declivent, slightly (male) or scarcely (female) sulcate throughout; frontal costa just failing to reach the clypeus, equal or feebly broader below, scarcely narrower than the interspace between the eyes, feebly sulcate at and below the ocellus, biserially punctate; eyes moderately large and prominent, as long as the infraocular portion of the genae; antennae more than three-fourths (male) or a little more than three-fifths (female) as long as the hind femora, fulvous, sometimes feebly infuscated. Pronotum dark fuscous, occasionally ferruginous, the disk sometimes with a distinct, broad, equal, piceous band crossing the prozona above and occasionally vaguely continued across the metazona, usually marked beneath by luteous, or the whole lower portion luteous; disk very broadly convex, passing by an abruptly rounded shoulder, nowhere forming lateral carinae, into the vertical lateral lobes, which are slightly tumid anteriorly; median carina subobsolete on the prozona; front margin faintly convex, hind margin not very obtusely angulate; prozona longitudinal (male) or quadrate (female), a little (male) or scarcely (female) longer than the closely but somewhat obscurely punctate metazona. Prosternal spine not very long, cylindrical, erect, very blunt; interspace between mesosternal lobes twice (female) or four times (male) as long as broad, the metasternal lobes attingent for some distance (male) or subattingent (female). Tegmina reaching or a little surpassing the tips of the hind femora (varying in both sexes), tapering gently, brownish fuscous more or less indistinctly maculate with fuscous, sometimes

blackish fuscous, and pallid; wings hyaline, iridescent, the veins brownish fuscous anteriorly and apically. Fore and middle femora but very little tumid in the male; hind femora varying from luteo-testaceous to ferruginous, the inner half of the upper face bifasciate with fuscous, which sometimes crosses also the outer half of the same and rarely extends upon the upper portion of the outer face, and is occasionally subobsolete altogether, the lower face and lower half of the outer face nearly always luteous or lutescent, the outer face often streaked with blackish fuscous along its upper margin; hind tibiae bright red, the spines black except at base, ten to thirteen in number in the outer series. Extremity of male abdomen a little clavate and upturned, the supraanal plate ovate with an apical ovate extension, the sides well rounded and broadly elevated, the apical portion about a fifth of the whole and a miniature of the base, the median sulcus rather large, with well-rounded walls, percurrent but interrupted in the depressed zone beyond the middle; furcula consisting of a pair of strongly divergent, arcuate, somewhat depressed but rounded, regularly tapering, acuminate fingers, less than a third as long as the supraanal plate; cerci rather small, compressed, incurved plates, gradually constricted in the middle and well rounded apically, the apical half broadly depressed or sulcate exteriorly, not nearly reaching the tip of the supraanal plate; infracercal plates similar to those of *M. comptus*, but a little less broad and almost as long as the supraanal plate; subgenital plate forming a regular, well-rounded, hardly flaring scoop, the apical margin very feebly elevated and broadly and faintly notched.

Length of body, male, 22.5 mm., female, 25 mm.; antennae, male, 9.75 mm., female, 8.5 mm.; tegmina, male, 16.5 mm., female, 17 mm.; hind femora, male, 12.75 mm., female, 13.5 mm.

Twenty-eight males, 31 females. Sudbury, Ontario, July; Nebraska, Dodge; Sand Hills, Nebraska, July (L. Bruner); Fort Robinson, Dawes County, August 21, Gordon, Sheridan County and Valentine, Cherry County, Nebraska, Bruner (U.S.N.M.—Riley collection); Barbour County, Kansas, Cragin (L. Bruner); Lakin, Kearny County, Kansas, 3,000 feet, September 1; Colorado, 5,500 feet, Morrison; Rocky Mountains, Colorado, August (University of Kansas); Denver, Colorado, October 5; Beaver Brook, Jefferson County, Colorado, Uhler; Garden of the Gods, El Paso County, Colorado, October 6; Manitou, El Paso County, Colorado, August 9; Colorado Springs, El Paso County, Colorado, August, E. S. Tucker (University of Kansas); Garland, Costilla County, Colorado, 8,000 feet, August 28–29; Salt Lake, Utah, July 21, Packard.

Specimens sometimes occur, probably only in sandy stations, in which the insects are of a nearly uniform flavous color, often tinged slightly with ferruginous, giving a very different general appearance from the normal.

94. MELANOPLUS ANGUSTIPENNIS.

(Plate XX, fig. 6.)

Caloptenus angustipennis DODGE, Can. Ent., IX (1877), p. 111.—BRUNER, *ibid.*, IX (1877), p. 145.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 43.—BRUNER, *ibid.*, III (1883), p. 60.

Melanoplus angustipennis BRUNER, Bull. Washb. Coll., I (1885), p. 138; Bull. Div. Ent. U. S. Dep. Agric., XIII (1887), p. 11.—OSBORN, Proc. Iowa Acad. Sc., I, Pt. II (1892), p. 118.—BRUNER, Bull. Div. Ent. U. S. Dep. Agric., XXVIII (1893), pp. 24–25, fig. 12; Publ. Nebr. Acad. Sc., III (1893), p. 27.

Of medium size, dark-fuscous. Head feebly prominent, plumbeo- or ferrugineo-testaceous, often mottled with fuscous, above much infuscated, except at the margins of the eyes, and with a postocular piceous band; vertex gently tumid, slightly elevated above the pronotum, the interspace between the eyes considerably broader than (male) or nearly twice as broad as (female) the first antennal joint; fastigium strongly declivent, distinctly (male) or feebly (female) sulcate throughout; frontal costa equal, percurrent, as broad as the interspace between the eyes, faintly sulcate at and below the ocellus, biserially punctate; eyes moderately large and prominent, as long as the infraocular portion of the genae; antennae fulvous, about five-sixths (male) or two-thirds (female) as long as the hind femora. Pronotum dark fuscous, lighter on the lateral lobes, with a subluteous median streak, bordering a broad postocular piceous band on the prozona; disk feebly enlarging posteriorly, very broadly convex, passing into the vertical lateral lobes by a roundly angulated shoulder, forming tolerably distinct lateral carinae on the posterior half of the pronotum; median carina distinct on the metazona, obsolete (male) or subobsolete (female) on the prozona; front margin subtruncate, hind margin obtusangulate; prozona longitudinal (male) or quadrate (female), distinctly (male) or scarcely (female) longer than the closely punctate metazona. Prosternal spine not very long, erect, conico-cylindrical, blunt; interspace between mesosternal lobes more than twice as long as broad (male) or quadrate (female), the metasternal lobes attingent over a brief space (male) or approximate (female). Tegmina reaching or slightly surpassing the tips of the hind femora, slender, tapering, brownish-fuscous, immaculate or with very obscure and feeble maculation along the middle line; wings moderately narrow, hyaline, iridescent, with relatively few dark veins and these not so dark as usual. Fore and middle femora distinctly but not greatly tumid in the male; hind femora olivaceo-luteous, more or less infuscated or infuscated excepting below, the inner half of the upper face feebly bifasciate with fuscous, and the geniculation more or less infuscated; hind tibiae glaucous, apically growing feebly lutescent, the spines black apically, pallid basally, nine to twelve in number in the outer series. Extremity of male abdomen a little clavate but scarcely recurved, the supraanal plate long triangular with broadly upturned basally convex

sides, laterally compressed just before the apex and the margin a little tortuous, the apex itself strongly acutangulate but blunt, the median sulcus percurrent, but nearly effaced at the constriction; furcula consisting of a pair of slender, subcylindrical, pretty strongly divergent, arcuate, regularly tapering, acuminate fingers, not a third as long as the supraanal plate; cerci consisting of spatulate incurved pads, hardly three times as long as the basal breadth, gently and slightly tapering from base to middle, beyond well rounded, nearly as broad as at base, exteriorly hollowed, and reaching only to the compressed part of the supraanal plate; infracercal plates forming broad tapering cushions for the cerci to rest upon, as long as the supraanal plate; subgenital plate forming a feebly flaring quadratic scoop, the apical margin feebly elevated laterally and between these elevations feebly notched.

Length of body, male, 20 mm., female, 22.5 mm.; antennae, male, 10 mm., female, 8.75 mm.; tegmina, male, 16 mm., female, 16.5 mm.; hind femora, male, 11.5 mm., female, 13 mm.

Three males, 3 females. Fort Robinson, Dawes County, Nebraska, August (L. Bruner); West Point, Cuming County, Nebraska, July (U.S.N.M.—Riley collection); Yellowstone, Montana, August (L. Bruner). Since description, Mr. W. S. Blatchley has sent me specimens from Lake County, Indiana.

Bruner states that this species feeds on *Artemisia* and prefers "to jump from plant to plant rather than to alight upon the ground." "It occurs both on high and low lands, but appears to be somewhat partial to old breakings and well-fed pastures of many years' use."

I suspect that the insect from Minnesota, described by Thomas¹ as a variety of *Caloptenus occidentalis*, may belong to this species.

95. *MELANOPLUS IMPIGER*, new species.

(Plate XX, figs. 7, 8.)

Of moderately large size, above rather light brownish fuscous with a ferruginous tinge, below luteo-testaceous. Head slightly prominent, dull luteo-testaceous, often punctate with olivaceous, with a postocular piceous band, and above much mottled or marmorate with fuscous; vertex gently tumid, considerably elevated above the level of the pronotum, the interspace between the eyes fully half as broad again (male) or fully twice as broad (female) as the first antennal joint; fastigium steeply declivent, shallowly and broadly sulcate, sometimes feebly in the female; frontal costa percurrent (male) or scarcely percurrent (female), feebly contracted above but otherwise subequal, as broad as the interspace between the eyes, and so distinctly broader in the female than in the male, feebly but variably sulcate at and a little below the ocellus, punctate throughout; eyes rather large, not very prominent, distinctly longer than the infraocular portion of the genae; antennae

¹Rep. U. S. Geol. & Geogr. Surv., V., p. 162.

fulvous or flavous, more (male) or less (female) than two-thirds as long as the hind femora. Pronotum subequal, feebly enlarging posteriorly, with a very broad postocular piceous band, occasionally maculate especially in the female, rarely surpassing the prozona and then broadening and decidedly weakening on the metazona; disk very broadly convex, passing by a blunt shoulder nowhere forming distinct lateral carinae into the vertical, anteriorly feebly tumid, lateral lobes; median carina distinct on the metazona, subobsolete on the prozona, sometimes wholly obsolete between the sulci; front margin subtruncate, hind margin obtusangulate, the angle rounded; prozona longitudinal (male) or quadrate (female), distinctly (male) or scarcely (female) longer than the ruguloso-punctate metazona. Prosternal spine conical, bluntly pointed (male) or appressed cylindrical, very blunt (female), moderately long, erect; interspace between mesosternal lobes about three times as long as (male) or a little longer than (female) broad, the metasternal lobes attingent over a considerable space (male) or approximate (female). Thoracic pleura luteous, the incisure black and the mesothoracic epimera darker than the ground, often blackish or even black. Tegmina surpassing considerably the hind femora, of normal breadth, feebly tapering, brownish fuscous, with usually very distinct and prominent maculation of quadrate blackish spots, interrupting a median luteous or pallid stripe in the basal half, becoming a sprinkling of blackish dots beyond, sometimes found also more or less obscurely in the other areas; wings moderately broad, hyaline, sometimes very feebly infuscated at the edge near the tip, the veins bluish fuscous apically and anteriorly. Fore and middle legs only a little tumid in the male, luteo-testaceous flecked with fuscous; hind femora luteo-testaceous, twice barred above with blackish fuscous besides a basal spot, and more or less deeply infuscated geniculation, the bars liable on the middle of the outer face to fuse more or less completely into a median stripe, which sometimes suffuses the whole face; lower face sometimes feebly roseate; hind tibiae very feebly valgate, glaucous, occasionally feebly infuscated, the base and tip feebly lutescent, with a narrow postbasal fusco-glaucous annulus, the spines rather short, black beyond their pallid bases, ten to eleven in number in the outer series. Extremity of male abdomen slightly clavate, upturned but scarcely recurved, the supraanal plate ovate-triangular, broadest at some distance beyond the base, the sides broadly and gently uplifted, the elevation abruptly broken by a preapical lateral transverse sulcation, the apex acutangulate, the median sulcus occupying the basal half, and very shallow and equal, except when, as sometimes, the apical portion is much compressed; furcula consisting of a pair of long and slender, equally tapering and acuminate, more or less flattened, slightly divergent and very feebly arcuate fingers, somewhat less than half as long as the supraanal plate; cerci small, compressed, subequal, incurved, lateral plates, gradually and rather slightly contracted mesially, the tip

well rounded, subspatulate, and exteriorly broadly sulcate or depressed, reaching only the break in the lateral margin of the supraanal plate; infracercal plates extending laterally distinctly beyond the cerci, and apically to the tip of the supraanal plate; subgenital plate pretty regularly scoop-shaped, scarcely flaring, the apical margin almost entire, or emarginate only by a feeble lateral elevation of the margin as seen from behind.

Length of body, male, 26.5 mm., female, 27 mm.; antennae, male, 11 mm., female, 10.5 mm.; tegmina, male, 22 mm., female, 21 mm.; hind femora, male, 15.5 mm., female, 16 mm.

Sixteen males, 36 females. Texas, Lincecum, Belfrage, Schaupp (S. H. Scudder; L. Bruner); Dallas, Texas, Boll (S. H. Scudder; L. Bruner; Museum Comparative Zoology); Bosque County, Texas, October 3, November 1, Belfrage; Uvalde, Texas, last of July, E. Palmer; San Antonio, Bexar County, Texas, June, M. Newell, (L. Bruner); Carrizo Springs, Dimmit County, Texas, November, A. Wadgymar (L. Bruner); Corpus Christi Bay, Nueces County, Texas, December 11-20, E. Palmer; Gulf Coast of Texas, Aaron; Barber County, Kansas, Cragin (L. Bruner).

I had formerly mistaken this species for *Cal. occidentalis* Thomas, and distributed specimens under that name. This note may serve to correct the error. The longer furcula serves somewhat readily to distinguish this species from the preceding, smaller and less heavily maculate species.

22. PACKARDII SERIES.

This is a group in which the prozona of the male is usually quadrate or subquadrate, and the interval between the mesothoracic lobes of the same sex varies from quadrate to fully twice as long as broad. The prosternal spine is usually rather short, often appressed. The tegmina are always fully developed and reach or surpass a little the tips of the hind femora; the hind tibiae are generally red, sometimes blue, and have nine to twelve spines in the outer series.

The supraanal plate is as in the collinus series. The furcula is slightly developed, consisting of moderately slender denticulations, not longer than the last dorsal segment. The cerci are generally moderately broad, gently spatulate, the apical portion generally inbent, sometimes merely incurved, often externally sulcate. The subgenital plate is never very broad, ordinarily rather narrow, subequal or apically narrowed, the apical margin neither elevated nor prolonged, and generally well rounded and entire.

The five species are of rather large or medium size, and comprise two tolerably distinct sets: one, of two species, of ordinary form, with short, apically truncate cerci, not nearly attaining the tip of the supraanal plate, and with strongly divergent forks to the furcula; and a second, of three species, of very robust form, cerci which though short

reach or nearly reach the tip of the supraanal plate and are apically sulcate, with parallel or subparallel distant forks to the furecula.

The species are all found west of the Mississippi, ranging from British Columbia and Assiniboia to Central Mexico, but are not known in California except in the north.

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96. MELANOPLUS PACKARDII.

(Plate XXI, figs. 1-4.)

Caloptenus fasciatus SCUDDER!, Proc. Bost. Soc. Nat. Hist., XVII (1875), p. 477; Ent. Notes, IV (1875), p. 76; Bull. U. S. Geol. Surv. Terr., II (1876), p. 261.—BRUNER, Can. Ent., IX (1877), p. 144.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 42.—SCUDDER!, Cent. Orth. (1879), p. 21.

Melanoplus packardii SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1878), p. 287; Ent. Notes, VI (1878), p. 46; Rep. U. S. Ent. Comm., II (1881), App., p. 24, pl. XVII, figs. 7-8.—BRUNER, *ibid.*, III (1883), p. 60; Can. Ent., XVII (1885), p. 18; Bull. Washb. Coll., I (1885), p. 139; Rep. U. S. Ent., 1885 (1886), p. 307.—CAULFIELD, Rep. Ent. Soc. Ont., XVIII (1888), p. 71.—KOEBELE, Bull. Div. Ent. U. S. Dep. Agric., XXII (1890), p. 94.—BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 27.

Melanoplus packardii rufipes COCKERELL, Entom., XXII (1889), p. 127.

Pezotettix arkansana MCNEILL!, MS.

Of tolerably large size, brownish yellow. Head a little prominent, luteo-testaceous; a broad dark brown or blackish median band extends from the vertex between the eyes to the posterior extremity of the pronotum, broadest on the latter and occupying about one-third of it, but sometimes, and especially in southern examples, wholly absent from the pronotum; besides this, another band runs from behind the eye to the anterior margin of the metazona; generally this is comparatively narrow and often obscure, but often sends off streaks of blackish fuscous down the incisures, and is sometimes tolerably distinct and uniformly deep in tint; vertex considerably tumid, well raised above the level of the pronotum, the interspace between the eyes fully half as broad again (male) or more than twice as broad (female) as the first antennal joint; fastigium strongly declivent, slender, with parallel sides, and rather deeply sulcate; frontal costa as broad as the interspace between the eyes, equal, scarcely sulcate below the ocellus, biserially punctate above; eyes large, not very prominent even in the male, elongate but no longer than the infraocular portion of the genae; antennae yellow, somewhat infuscated apically, fully three-fourths (male) or but little more than two-thirds (female) as long as the hind femora. Pronotum slightly expanding posteriorly, the disk broadly convex and passing by a well rounded shoulder, which only posteriorly forms the semblance of lateral carinae, into the vertical lateral lobes; median carina scarcely perceptible except on the metazona, where it is distinct but not prominent; transverse sulci distinct;

front margin subtruncate, hind margin obtusangulate; prozona longitudinal (male) or quadrate (female), only a little longer than the densely punctate metazona. Prosternal spine rather long, erect, subpyramidal, not very blunt, its anterior face vertical; interspace between mesosternal lobes fully twice as long as broad (male) or a little longer than broad (female). Tegmina surpassing a little the hind femora, rather broad, tapering considerably in the apical half, brownish fuscous, with a row of dusky quadrate spots down the proximal half of the discoidal area, but sometimes wholly immaculate. Wings hyaline, glistening, the veins in the apical and anterior regions fuscous. Legs yellow, tinged with dull orange, the hind femora faintly bifasciate above internally, and with the upper exterior carina black; hind tibiae normally glaucous, paler and dull at the apex, sometimes uniform red, the spines pallid, black apically, ten to eleven, rarely twelve, in number in the outer series. Extremity of male abdomen distinctly clavate, but little recurved; supraanal plate triangular, with thickened feebly upraised edges and a coarse percurrent median sulcus; furecula consisting of a pair of short, divergent, flattened, tapering, often unequally tapering fingers, extending over the supraanal plate by hardly more than the length of the last dorsal segment; cerci rather small, strongly compressed, bent inward, nearly equal throughout but smallest mesially, truncate at tip; subgenital plate moderately broad, subequal, longer than broad, with nearly even lateral margins, entire and subtuberculate at tip, broadly rounded as viewed from above.

Length of body, male 28.5 mm., female 26 mm.; antennae, male 12.5 mm., female 10.5 mm.; tegmina, male 24.5 mm., female 23 mm.; hind femora, male 16 mm., female 15 mm.

Seventy males, 106 females. British Columbia, Croteh (Museum Comparative Zoology; S. H. Scudder); La Chapples, Yakima River, Washington, July 16, S. Henshaw (Museum Comparative Zoology); Little Spokane, Washington, July 24, S. Henshaw (same); Camp Umatilla, Washington, June 27, Henshaw (same); Ellensburg, Kittitas County, Washington, July 14–15, Henshaw (same); Wallula, Wallawalla County, Washington, Packard (U.S.N.M.—Riley collection; S. H. Scudder); Umatilla, Oregon, June 24, Henshaw (Museum Comparative Zoology; L. Bruner); Siskiyou County, California (U.S.N.M.—Riley collection); Boise City, Ada County, Idaho (same); Salmon City, Lemhi County, Idaho (same); Henry Lake, Idaho, August (L. Bruner); Soda Springs, Bannock County, Idaho (same); Montana (U.S.N.M.—Riley collection); Yellowstone, Montana (same); Fort Benton, Choteau County, Montana, July (same); Glendive, Dawson County, Montana, Bruner (same); Fort McKinney, Johnson County, Wyoming, July (same); Crawford County, Iowa, July 13–24, J. A. Allen; Denison, Crawford County, Iowa, July 20, Allen; Dallas County, Iowa, August, Allen; Jefferson, Greene County, Iowa, July 20–24, *in coitu*, Allen; Nebraska, Dodge (S. Henshaw; S. H. Scudder); Pine Ridge, Nebraska, July (L. Bruner); Valentine, Cherry County, Nebraska, Bruner (U.S.N.M.—

Riley collection; L. Bruner); Gordon, Sheridan County, Nebraska, Bruner (same); Fort Robinson, Dawes County, Nebraska, August 22, Bruner (same); West Point, Cuming County, Nebraska (L. Bruner); Cheyenne County, Kansas, Cragin (same); Lakin, Kearny County, Kansas, 3,000 feet, September 1; Finney County, Kansas, H. W. Menke (University of Kansas); Pine Bluff, Jefferson County, Arkansas, September 1 (J. McNeill); Salt Lake Valley, Utah, 4,300 feet, August 1-4; American Fork Canyon, Utah County, Utah, 9,500 feet, August 2-3; Salt Lake, Utah, July 26, common, A. S. Packard; Spring Lake Villa, Utah County, Utah, August 1-4, E. Palmer; Ruby Valley, Nevada, R. Ridgway; Colorado, 5,500 feet, Morrison (S. Henshaw; S. H. Scudder); Colorado, July (U.S.N.M.—Riley collection); Garden of the Gods, El Paso County, Colorado, July, October (University of Kansas; S. H. Scudder); Colorado Springs, El Paso County, Colorado, July, August, E. S. Tucker (University of Kansas); Florissant, El Paso County, Colorado, 8,000 feet, August 17-22; Pueblo, Colorado, 4,700 feet, July 8-9, August 30-31; Poudre River, Colorado, (L. Bruner); Santa Fe, New Mexico, June, T. D. A. Cockerell; Texas, Belfrage, June-September (U.S.N.M.—Riley collection; S. H. Scudder); Dallas, Texas, Boll (same).

It has also been reported from Garden City, Kansas (Bruner), Regina, Assiniboia (Caulfield), and northern California, abundant (Koebele).

This species bears a close general resemblance to *M. bivittatus*, from which it is nevertheless very distinct. Bruner says, with regard to it, that "it never leaves the open country for timbered or low localities where the vegetation is rank," as that and other species do. It is a prairie species.

Cockerell has given the variety with red hind tibiae a distinctive name. I have seen it from British Columbia, Washington, Oregon, northern California, Idaho, Montana, Nebraska, Kansas, Utah, Nevada, Colorado, and New Mexico. It appears to be the prevailing if not exclusive form in some northern parts of its range. Specimens before me from Wyoming, Iowa, and Texas have blue legs only; both forms occur in Montana, Nebraska, Utah, and Colorado.

In coloring and markings it is one of the most variable species of *Melanoplus* known to me, but I have been unable to find grounds for specific distinctions between the various forms, which seem to run into each other completely.

97. MELANOPLUS FOEDUS.

(Plate XX, fig. 9.)

Melanoplus foedus SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), p. 69; Cent. Orth. (1879), p. 58.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 61; Ins. Life, IV (1891), p. 146; Bull. Div. Ent. U. S. Dep. Agric., XXVII (1892), p. 29; *ibid.*, XXVIII (1893), pp. 21-22, fig. 9 a b; Publ. Nebr. Acad. Sc., III (1893), p. 27; Rep. Nebr. St. Bd. Agric., 1893 (1893), p. 460.

Of medium or rather large size. Head rather large, not elevated, slightly arched; eyes pretty large, but not prominent; interspace

between the eyes as broad (male) or half as broad again (female) as the first antennal joint; fastigium shallow (female) or moderately sulcate (male) with low, stout, nearly parallel, bounding walls and scarcely expanding in front; frontal costa stout, well advanced, subequal, scarcely enlarging downward, above flat, at the ocellus and below it a little and broadly sulcate. Pronotum simple, the metazona coarsely and faintly punctate, expanding very slightly and a little depressed above anteriorly, on either side; prozona narrowed a little in front but above only; transverse sulci distinct and continuous; median carina slight and confined to the metazona, lateral carinae subobsolete. Prosternal spine not very long, erect, appressed conical, blunt; interspace between mesosternal lobes thrice (male) or nearly twice (female) as long as broad. Tegmina extending a little (female) or considerably (male) beyond the abdomen. Extremity of male abdomen clavate, hardly recurved, the supraanal plate triangular, considerably longer than broad, bluntly pointed, the sides nearly straight, slightly puckered in the middle; furcula consisting of a pair of sinuous, depressed, conical, pointed projections, diverging at right angles, about half as long as the cerci; cerci forming very simple compressed laminae, the basal three-fifths straight, tapering a little and directed backward and upward, the apical two-fifths also straight, enlarging slightly, keeping the same direction but bent a little inward, the outer surface a little hollowed, the extremity truncate, its corners rounded; subgenital lobe scoop-shaped but slightly produced at the apex, the margin entire. Basal tooth of the lower valves of the ovipositor sharp, triangular, but much broader than long.

The general color is a dirty cinereous above, a dingy clay yellow below; antennae dull testaceous, becoming somewhat ferruginous toward the tip; a pretty broad and usually distinct, blackish brown or piceous band extends from behind the eye along the upper portion of the lateral lobes across the prozona, and sometimes as a blurred and expanded continuation of it across the metazona also. Tegmina brownish cinereous, the anal area sometimes a little lighter, the discoidal area enlivened to a greater or less extent, but seldom conspicuously, by an alternation of blackish and pallid longitudinal rectangular spots. Hind femora dirty clay brown with dusky incisures, above with median and subapical dusky or dark fuscous patches; hind tibiae red with black-tipped spines, ten to twelve in number in the outer series.

Length of body, male, 24 mm., female, 30 mm.; antennae, male, 13.5 mm., female, 12 mm.; tegmina, male, 21 mm., female, 24 mm.; hind femora, male, 14 mm., female, 16.5 mm.

Twelve males, 11 females. Pueblo, Colorado, August 30-31.

The original types of this species are all that I have seen, but it is said by Bruner to be found also in "Kansas, Nebraska, Wyoming, Utah, Nevada, Idaho, Montana, and the Dakotas, along with New

Mexico." As all the specimens seen from these regions which might be referred to this species (and in some instances have been so labeled) prove to belong to *M. packardii*, I think it probable that some at least of these localities may be wrongly given. The species indeed differs but slightly from *M. packardii*, and may prove to be merely a varietal form of it dependent upon station, which in this species is in the dank vegetation of river bottoms where *M. packardii* occurs but rarely. I took a few specimens of the latter, however, in company with the former.

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98. MELANOPLUS CORPULENTUS, new species.

(Plate XX, fig. 10.)

Melanoplus corpulentus BRUNER!, MS.

A heavy-bodied form, somewhat above the medium size, fusco-testaceous, tinged with ferruginous. Head not prominent, olivaceo-testaceous, often much blotched with fuscous, above always much infuscated, generally in longitudinal streaks, the lateral edges of the fastigium more or less blackened, and with a generally distinct postocular stripe; vertex gently tumid, slightly elevated above the pronotum, the interspace between the eyes nearly half as broad again (male) or twice as broad (female) as the first antennal joint; fastigium steeply declivent, considerably (male) or shallowly (female) sulcate; frontal costa failing by some distance to reach the clypeus, slightly contracted above, at its widest as broad as the interspace between the eyes, sulcate at, and in the male below, the ocellus, punctate throughout; eyes not very large, feebly prominent in the male, anteriorly truncate (female) or subtruncate (male), about as long as the infraocular portion of the genae; antennae red, sometimes a little infuscated apically, somewhat more than four-fifths (male) or than two-thirds (female) as long as the hind femora. Pronotum stout, distinctly enlarging posteriorly, especially in the female, more or less and irregularly clouded with fuscous on the disk, often with a ferruginous tinge especially on the metazona, the lateral carinae occasionally marked obscurely with flavous, the lateral lobes generally but obscurely infuscated at the upper half of the prozona, often broken by lighter tints; disk broadly convex, passing into the subvertical lateral lobes by a rounded shoulder occasionally forming distinct carinae; median carina distinct on the metazona, less distinct (female) or subobsolete especially between the sulci (male) on the prozona; front margin subtruncate, hind margin obtusangulate, the angle generally very broadly rounded; prozona slightly longitudinal (male) or quadrate or feebly transverse (female), distinctly (male) or scarcely (female) longer than the rather obscurely punctate metazona; transverse sulci of prozona tolerably distinct, feebly arcuate, opening forward. Prosternal

spine moderately long, appressed cylindrical, rather stout, a little retrorse; interspace between mesosternal lobes about twice as long as broad (male) or distinctly transverse but narrower than the lobes (female), the metasternal lobes attingent (male) or moderately distant (female). Tegmina usually a little surpassing, sometimes hardly attaining the tips of the hind femora, moderately broad, distinctly tapering in the distal half, blackish fuscous with pallid cross-veins, and heavily though rather delicately maculate, especially but not exclusively in the discoidal area; wings ample, hyaline with the feeblest possible bluish flush, the apical and anterior venation fuscous or blackish fuscous. Fore and middle femora of male somewhat tumid; hind femora very stout, with prominent inferior carina, brownish fuscous with superior cloudy, rather broad, dark fasciation, the exterior face more or less testaceous clouded irregularly with fuscous, the lower face and lower half of inner face bright deep red, including sometimes a part of the lower genicular lobes, the rest of the geniculation infuscated; hind tibiae slightly valgate, stout, bright deep red, sometimes feebly infuscated at the extreme tip, the spines short, black to the base, ten to eleven, usually eleven, in number in the outer series. Extremity of male abdomen strongly clavate, considerably recurved, the supraanal plate subtriangular with broadly angulate sides and subrectangulate apex, the surface nearly plane, a little depressed in the apical half, with a rather shallow and broad, apically narrowing, percurrent median sulcus; furcula consisting of a pair of very slight, short, distant, diverging denticulations lying on the outer side of the ridges bordering the median sulcus of the supraanal plate; cerci compressed, considerably incurved or mesially bent laminae, hardly three times as long as broad, gradually constricted mesially, the apex well rounded but subangulate below, the whole apical portion rather deeply sulcate exteriorly, not reaching the tip of the supraanal plate; infracereal plates broad, exposed on either side of the base of the cerci, narrowing rapidly and extending to the tip of the supraanal plate; subgenital plate moderately broad, subequal, the apical margin well rounded, hardly flaring, mesially subangulate, not elevated, entire.

Length of body, male, 24 mm., female, 28 mm.; antennae, male, 11.75 mm., female, 11 mm.; tegmina, male, 16.5 mm., female, 22.5 mm.; hind femora, male, 14 mm., female, 15 mm.

Nineteen males, 15 females. Tlalpan, Mexico, November (L. Bruner); hills about San Luis Potosi, Mexico, October 15, E. Palmer; mountains twelve leagues east of San Luis Potosi, Mexico, Palmer; Sierra de San Miguelito, San Luis Potosi, Mexico, Palmer; Zacatecas, Mexico, November (U.S.N.M.—Riley collection); Sonora, Mexico, Schott; Silver City, Grant County, New Mexico, C. H. Marsh (L. Bruner).

99. MELANOPLUS CONSPERSUS, new species.

(Plate XXI, fig. 5.)

A stout, medium-sized or rather less than medium sized species, brownish fuscous above, testaceous beneath. Head a little prominent, luteo-testaceous clouded with plumbeous, broadly striped above with blackish fuscous, and with a subpiceous postocular band; vertex gently tumid, slightly elevated above the pronotum, the interspace between the eyes considerably broader than (male) or nearly twice as broad as (female) the first antennal joint; fastigium steeply declivent, distinctly sulcate throughout; frontal costa percurrent, subequal, almost (female) or quite (male) as broad as the interspace between the eyes, distinctly sulcate at and below the ocellus, biserially punctate above; eyes moderate, slightly prominent in the male, hardly so long as the infraocular portion of the genae; antennae red, becoming more or less infuscated apically, about four-fifths (male) or about three-fourths (female) as long as the hind femora. Pronotum stout, distinctly enlarging from in front backward, especially in the female, feebly tinged with ferruginous, the upper half of the lateral lobes of the prozona glistening brownish fuscous, the disk very broadly convex, passing into the subvertical lateral lobes by a well-rounded shoulder, hardly forming lateral carinae except feebly on the metazona; median carina percurrent, more distinct on the metazona than on the prozona, alike in the two sexes; front margin truncate, hind margin obtusangulate; prozona feebly transverse, of the same length as the rather obscurely punctate metazona. Prosternal spine not very high, stout, considerably appressed, tapering as seen from in front, blunt; interspace between mesosternal lobes almost twice as long as broad (male) or feebly transverse (female), the metasternal lobes attingent (male) or approximate (female). Tegmina reaching as far as the hind femora, of moderate breadth, tapering from the basal fourth, brown, heavily sprinkled with fuscous dots most abundant in but not confined to the discoidal area, where in the female they alternate with pallid dashes; wings moderate, hyaline with pale greenish veins, which become rather feebly infuscated anteriorly and apically. Fore and middle femora a little tumid in the male; hind femora very stout, testaceous or pallid testaceous, the upper face slightly ferruginous, except the lower third twice very obliquely and very broadly fasciate with blackish fuscous, the inferior third flavous, the genicular arc blackish fuscous; hind tibiae feebly valgate, bright red, the spines black to their base except on their inner side, ten in number in the outer series. Extremity of male abdomen somewhat clavate, slightly recurved, the supraanal plate subtriangular with basally angulate sides and acutangulate tip, the surface nearly flat but stepped, the apical half or less at a lower level and the lateral margins slightly crenate in consequence, the median sulcus rather slender, percurrent but slight in the apical half; funiculi consist-

ing of a pair of slight, distant, slightly divergent, slender denticulations on the outer side of the ridges bounding the median sulcus of the supraanal plate; cerci consisting of two parts—a straight, slightly tapering, punctate, compressed lamina about twice as long as broad, and a more strongly compressed apical flange bent at a tolerably strong angle with it, a little expanded, apically rounded angulate, externally deeply sulcate, scarcely falling short of the tip of the supraanal plate; infracercal plates apparently as in *M. corpulentus*; subgenital plate moderately broad, subequal, the apical margin not elevated, very feebly flaring, strongly rounded, not mesially angulate, entire.

Length of body, male, 20 mm., female, 23.5 mm.; antennae, male, 8.5 mm., female, 9 mm.; tegmina, male, 14.5 mm., female, 16 mm.; hind femora, male, 10.5 mm., female, 12.5 mm.

One male, 1 female. Southwest Nebraska (L. Bruner).

This species looks like a diminutive form of the preceding, but differs from it in many points of structure and in coloring, besides those mentioned in the table.

100. *MELANOPLUS COMPACTUS*. new species.

(Plate XXI, fig. 6.)

Melanoplus compactus BRUNER!, MS.

A medium-sized species, blackish fuscous in coloring, more or less tinged with ferruginous. Head not prominent, rufo-luteous more or less clouded with fuscous, with a median blackish fuscous stripe above and a postocular piceous band; vertex gently tumid, feebly elevated above the pronotum, the interspace between the eyes considerably broader than (male) or nearly twice as broad as (female) the basal antennal joint; fastigium steeply declivent, sulcate throughout, more deeply in the male than in the female; frontal costa just failing to reach the clypeus, feebly narrowed above but otherwise subequal, as broad as the interspace between the eyes, sulcate at and below the ocellus, biserially punctate above; eyes not prominent nor large, about as long as the infraocular portion of the genae; antennae red, gradually infuscated apically, in the female more than three-fourths as long as the hind femora. Pronotum stout, gradually enlarging posteriorly, the lateral lobes of the prozona with a more or less distinct piceous postocular band, the disk passing into the vertical lateral lobes by a distinctly though slightly angulated shoulder, forming feeble lateral carinae; median carina percurrent but much feebler on the prozona than on the metazona; front margin truncate, hind margin obtusangulate; prozona feebly (male) or distinctly (female) transverse, no longer than the closely punctate metazona. Prosternal spine rather short and rather stout, much appressed, tapering, very blunt; interspace between mesosternal lobes a little longitudinal (male) or a little transverse (female), the metasternal lobes attingent (male) or moderately distant (female). Tegmina surpassing a little the hind femora, moderately broad, brownish fuscous

punctate with fuscous, especially in the discoidal area where the puncta are aligned with lutescent marks; wings moderately ample, hyaline, the veins pale fuscous, becoming darker anteriorly and apically. Fore and middle femora considerably tumid in the male; hind femora stout, dull testaceous, very obliquely bifaciate with blackish fuscous, except beneath, which is flavous; hind tibiae feebly valgate, bright red, the short black spines with pallid bases, nine to eleven in number in the outer series. Extremity of male abdomen somewhat clavate, a little recurved. the supraanal plate subtriangular with acutangulate apex, nearly plane surface, apically stepped by a distinct transverse ridge just beyond the middle, the median sulcus broad and shallow in the basal portion, narrow beyond; furcula consisting of a pair of slight, distant, parallel denticulations lying outside the ridges bounding the median sulcus of the supraanal plate; cerci and infracercal plates entirely as in *M. conspersus*; subgenital plate rather narrow, equal, not at all flaring, the apical margin not at all elevated, well rounded, entire.

Length of body, male, 21 mm., female, 22.5 mm.; antennae, female, 10 mm.; tegmina, male, 16.25 mm., female, 17.25 mm.; hind femora, male, 11 mm., female, 12.5 mm.

Two males, 2 females. Dakota (U.S.N.M.—Riley collection); Gordon, Sheridan County, Nebraska, L. Bruner (same).

This species is closely related to the preceding, from which it differs in the narrowness of the subgenital plate of the male and the difference in the interspace between the mesosternal lobes. Its general resemblance is very close.

23. TEXANUS SERIES.

In this not altogether homogeneous group, the prozona of the male is longitudinal, generally distinctly longitudinal, and the interspace between the mesosternal lobes in the same sex is almost, or fully, or even more than, twice as long as broad. With the exception of the first species, the hind margin of the pronotum is obtusangulate. The antennae are variable. The tegmina are also variable though always abbreviate, and in most of the species are longer than the pronotum and overlap, but in the first they are shorter and distant. The hind tibiae are red or glaucous and have nine to thirteen spines in the outer series.

The supraanal plate is triangular with more or less elevated margins and distinct median sulcus; the furcula is reduced to small or even minute denticulations; the cerci are large, constricted in the middle and again expanded, more or less incurved and sometimes again apically bent in the original direction; the subgenital plate is broad, generally produced or elevated apically, the margin entire.

There are five species, all occurring west of the Mississippi, except one which is found in the upper Mississippi region; of the others two occur in Texas (and one of them in Kansas also), a fourth east of the

Sierra Nevada in central California, and the last in central Mexico. I have also in my collection another species (No. 351) from Mexico, allied to one of the Texan species, but of which I know only the female, and therefore do not describe.

This series represents to a certain extent, in brachypterous forms, the robustus series of macropterous species.

§

101. MELANOPLUS DUMICOLA.

(Plate XXI, fig. 7.)

Pezotettix dumicolus SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), pp. 76-77; Cent. Orth. (1879), pp. 65-66.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.

Of small size, smooth and glistening. Head not prominent, the vertex feebly tumid, scarcely elevated above the pronotum, the interspace between the eyes very narrow, much less than (male) or scarcely equaling (female) the width of the first antennal joint; fastigium steeply declivent, shallow, slender, subspatulate with rather coarse bounding walls; frontal costa moderate, equal except in being very slightly and roundly contracted above, wider than the interspace between the eyes, sulcate at and below the ocellus, sparsely punctate; eyes rather large, rather prominent especially in the male, very much longer than the infraocular portion of the genae; antennae four-fifths (male) or two-thirds (female) as long as the hind femora. Pronotum very simple, uniformly and very slightly expanding posteriorly, the front border truncate or scarcely convex, the hind border slightly and broadly mesially emarginate; lateral carinae completely obsolete and uniform, the disk passing insensibly into the lateral lobes; median carina faint, very blunt, equal throughout; prozona distinctly (female) or very (male) longitudinal, sparsely and rather faintly punctate, the metazona more distinctly and abundantly but with minuter puncta. Prosternal spine rather small, erect, conical, in the female a little appressed; interspace between mesosternal lobes more than twice as long as broad (male) or quadrate (female). Tegmina lateral, minute, considerably shorter than the pronotum, bluntly rounded apically, the inner margin nearly straight, the costal very convex, the whole twice as long as broad. Fore and middle femora considerably tumid in the male. Extremity of male abdomen considerably clavate, strongly recurved, the supraanal plate triangular, a very little longer than broad, the sides nearly straight, the extreme tip blunt; furcula reduced to a pair of broad, lamellate, triangular teeth, their angle projecting but little at the middle of either half of the supraanal plate; cerci broad, compressed-laminate, subequal but somewhat and broadly constricted in the middle, straight and directed upward, the apical half also incurved, the apex excised and produced a little above; subgenital plate quadrate, tumid, the apical margin semicircu-

lar, entire, the pallium projecting over it as a backward directed, stout, subdepressed, blunt process.

The general color is dark umber above, yellowish testaceous below; face dull olivaceous, in the female apparently darker by infuscation; antennae testaceous, more or less infuscated at the apical half; on the summit of the head a clay-colored band, which partly encircles the eyes and extends backward over the pronotum, on which it is very slightly arched; a similar but much broader and rather paler belt borders the lower margin of the lateral lobes, while a median line of the same color occurs on the abdomen, a mere line in front, broadening as it passes backward, extending over the whole dorsum and apically confluent with the lighter color of the under surface, leaving on either side between the upper and lower surfaces a broad but narrowing black belt. Hind femora with the outer face dark green, more or less infuscated, sometimes nearly black, especially on the upper half, the upper face ferruginous and the lower greenish yellow; hind tibiae rather dull green, occasionally obscured at either extremity, the spines with their apical half black, nine, rarely ten, in number in the outer series.

Length of body, male, 14 mm., female, 18.5 mm.; antennae, male, 7.25 mm., female, 7 mm.; tegmina, male, 2.8 mm., female, 3 mm.; hind femora, male, 9 mm., female, 10.5 mm.

Two males, 3 females. Bosque County, Texas, Belfrage.

Found in woods on plants and bushes in the latter half of September and the first half of October. Pairs were taken October 11. It is an aberrant member of the present group.



102. MELANOPLUS VARIABILIS, new species.

(Plate XXI, fig. 8.)

Pezotettix variabilis BRUNER!, MS.

Of medium size, green, more or less infuscated, the male the darker. Head a little longer than common but not otherwise prominent, olivaceous green, sometimes feebly suffused with ferruginous, above in darker examples more or less infuscated and always darker than below, with a brownish fuscous postocular band, sometimes broad, sometimes confined to its upper limits, margined above by lighter tints, the beginning of a subflavous stripe behind the upper part of the eyes; vertex gently tumid, faintly elevated above the pronotum, the interspace between the eyes twice (male) or more than thrice (female) as broad as the first antennal joint; fastigium very gently declivent, broadly and shallowly (male) or very shallowly (female) sulcate; frontal costa faintly narrowed above, as broad as (male) or much narrower than (female) the interspace between the eyes, expanding and evanescent next the clypeus, sulcate at and below the ocellus, sparsely punctate throughout, above biserially; eyes moderate in size, rather prominent in the male, a little longer than the infraocular portion of the

genae; antennae pale rufous or dark olivaceous, apically infuscated, two-thirds (male) or scarcely more than half (female) as long as the hind femora. Pronotum feebly (male) or gently (female) enlarging posteriorly, olivaceous green, more or less infuscated in the male, with a broad greenish-fuscous (female) or brownish-fuscous (male) postocular band confined to the prozona, the lateral carinae above it sometimes marked with dull flavous; disk nearly plane but subtectate, passing by an abrupt but rounded angulation, forming distinct percurrent lateral carinae, into the slightly tumid but otherwise vertical lateral lobes; median carina distinct, sharp, equal, percurrent; front margin subtruncate, hind margin very obtusangulate, sometimes rotundato-obtusangulate; prozona longitudinal (male) or longitudinally subquadrate (female), but little longer than the densely but shallowly punctate metazona. Prosternal spine very long, cylindrical or feebly conical, blunt, somewhat retrorse; interspace between mesosternal lobes more than half as long again as broad (male) or transversely subquadrate (female). Tegmina abbreviate, about as long as the pronotum, overlapping, short lanceolate, subacuminate and brownish fuscous (male) or green more or less suffused with fusco-ferruginous (female). Fore and middle femora considerably tumid in the male; hind femora green (female) or brownish fuscous (male), the outer face more or less ferruginous (female) or testaceous (male), the under surface sanguineous and the genicular arc black; hind tibiae green, in the male more or less infuscated, apically growing very pale ferruginous, the spines palid, black-tipped, ten to twelve in number in the outer series. Extremity of male abdomen clavate, considerably recurved, the supraanal plate triangular, acutangulate at apex, the lateral margins and the sharp submedian ridges equally and feebly elevated, forming between them a broad shallow sulcus, the median sulcus moderately broad, percurrent, not very deep; fureula consisting of a pair of slight approximate triangular denticulations; cerci large, stout, fully twice as long as broad, much narrowed in the middle by the strong arcuation of the upper margin, apically expanded into a subtriangular lobe, the whole nearly straight but slightly upcurved as seen from the side, sinuate as seen from above (though not so strongly as represented in the figure), being first curved inward and then slightly outward; subgenital plate subconical, the sides not vertical but inclined inward so that the free margins unite in an acute angle, while at the same time the apex is produced and elevated to form a conical marginal tubercle.

Length of body, male, 17.5 mm., female, 22 mm.; antennae, male and female, 6.75 mm.; tegmina, male, 6 mm., female, 6.25 mm.; hind femora, male, 10.5 mm., female, 13 mm.

Two males, 2 females. City of Mexico, Mexico, November, L. Bruner; Queretaro, Mexico, November (L. Bruner).

103. MELANOPLUS LEPIDUS, new species.

(Plate XXI, fig. 9.)

Slightly below medium size, blackish fuscous, with a feeble ferruginous tinge. Head not prominent, testaceous, very heavily flecked and punctate and often suffused with fuscous, above almost wholly blackish fuscous, with a slender testaceous stripe separating the dark vertex from the broad, piceous, postocular band; vertex gently tumid, distinctly elevated above the pronotum, the interspace between the eyes scarcely broader than (male) or nearly twice as broad as (female) the first antennal joint; fastigium steeply declivent, deeply (male) or moderately (female) sulcate throughout; frontal costa percurrent, faintly narrowed above in the male, otherwise equal, as broad as the interspace between the eyes, sulcate at and below the ocellus, punctate throughout, above biserially; eyes moderately large, rather prominent, especially in the male, somewhat longer than the infraocular portion of the genae; antennae castaneous, nearly five-sixths (male) or hardly three-fifths (female) as long as the hind femora. Pronotum subequal, faintly expanding posteriorly throughout (female) or only on the metazona (male), the lower portion of the lateral lobes ferrugineo-testaceous, the upper piceous, at least on the prozona, and sometimes obscurely so on the metazona, the disk broadly convex and passing by a scarcely angulate well-rounded shoulder, nowhere with a semblance of lateral carinae, into the vertical lateral lobes; median carina very slight, on the prozona subobsolete; front margin truncate, hind margin obtusangulate; prozona longitudinal (male) or quadrate (female), sparsely, coarsely, and very shallowly punctate, about half as long again as the finely and closely punctate metazona. Prosternal spine rather long, conical, erect, very blunt, feebly appressed, a little shorter and coarser in the female than in the male; interspace between mesosternal lobes nearly half as long again as broad (male) or quadrate (female). Tegmina abbreviate, about as long as the pronotum, attingent or feebly overlapping, broad ovate, nearly or somewhat less than twice as long as broad, apically angulate, blackish fuscous. Fore and middle femora somewhat tumid in the male; hind femora slender, particularly in the female, dull ferrugineo-testaceous, generally very broadly bifasciate with fuscous, and the whole geniculation fuscous, but these markings often more or less suffused and confused, the lower face warm testaceous; hind tibiae glaucous or dark glaucous, generally paler at the base, with a glaucous or fusco-glaucous patellar annulus, the spines black beyond the pallid base, eleven to thirteen in number in the outer series. Extremity of male abdomen considerably clavate and recurved, the supraanal plate triangular, with feebly angulate sides and sub-angulate apex, the margins gently elevated, the median sulcus equal, percurrent, moderately broad, rather deep, between sharp but little elevated walls, with a straight median transverse plica; furcula

consisting of a pair of distant slight denticulations, lying well outside the base of the submedian ridges of the supraanal plate; cerci broad at base, rapidly tapering to the middle, where they are about half as broad as at base, beyond again expanding wholly by the triangular production of the inferior apical portion, the apical margin truncate, the whole about two and a half times the basal breadth, feebly incurved; subgenital plate about as broad as long, the apical margin slightly elevated above the lateral, the two together, as seen from above, well rounded, entire.

Length of body, male, 17.5 mm., female, 21 mm.; antennae, male, 8 mm., female, 6 mm.; tegmina, male and female, 4 mm.; hind femora, male, 9.25 mm., female, 10.5 mm.

Six males, 7 females. Humboldt River, Nevada, August, S. W. Garman (Museum Comparative Zoology); mountains near Lake Tahoe, California, October 14, H. W. Henshaw, Wheeler's Expedition, 1876; Truckee, Nevada County, California, October 10.

104. *MELANOPLUS BLATCHLEYI*, new name.

(Plate XXI, fig. 10.)

Pezotettix occidentalis BRUNER, Can. Ent., VIII (1876), p. 124; *ibid.*, IX (1877), p. 144; Rep. U. S. Ent. Comm., III (1883), p. 59.—MCNEILL, Psyche, VI (1891), p. 76.—OSBORN, Proc. Iowa Acad. Sc., I, Pt. II (1892), p. 117.—BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 27.—BLATCHLEY!, Can. Ent., XXVI (1894), pp. 243-244.

Pezotettix viola BLATCHLEY!, Can. Ent., XXIII (1891), p. 81.

Of moderately large size, cinereo-fuscous with an olivaceous tinge. Head somewhat prominent, olivaceo-testaceous variably but generally considerably infuscated, above dark fuscous, separated by a testaceous stripe from the broad piceous postocular band; vertex gently tumid, feebly elevated above the pronotum, the interspace between the eyes half as broad again (male) or twice as broad (female) as the first antennal joint; fastigium somewhat steeply declivent, plane, with the lateral margins faintly raised in the male; frontal costa fading before the clypeus, equal or subequal, as wide as the interspace between the eyes, sulcate at and below the ocellus, at least in the male, somewhat densely punctate throughout; eyes moderately large and prominent, very much longer than the infraocular portion of the genae; antennae rufo-testaceous, scarcely shorter than (male), or nearly two-thirds as long as (female) the hind femora. Pronotum subequal, feebly enlarging (at least below) on the metazona, the sides with a broad piceous postocular band confined to the prozona in the male, the same being wholly obsolete, obscure, or confined to the upper limits of the lateral lobes in the female; disk very broadly convex, passing by a distinct but blunt angulation forming feeble lateral carinae into the inferiorly vertical lateral lobes; median carina distinct but not very sharp on the metazona, subobsolete or obsolete, especially between the sulci and, in the male, on the prozona; front margin truncate, hind margin obtusangulate, the angle

rounded in the female and sometimes in the male; prozona distinctly longitudinal (male) or quadrate or feebly longitudinal (female), generally more (male) or generally less (female) than one-third longer than the closely punctate metazona. Prosternal spine long, appressed cylindrical, blunt, retrorse; interspace between mesosternal lobes about half as long again as broad (male), or feebly transverse (female). Tegmina abbreviate, a little longer than the pronotum, overlapping, very broad just beyond the base and rapidly narrowing, short sublanceolate, the costal margin roundly angulate, apically subacuminate, the dorsal and lateral fields angularly separated, brownish fuscous, the dorsal field often cinereous, the lateral often feebly flecked with fuscous. Fore and middle femora very tumid in the male; hind femora testaceous or flavotestaceous, heavily and broadly but sometimes confusedly bifasciate with blackish fuscous, the geniculation blackish, the inferior face pale flavous, pallid apically; hind tibiae red, blackish at the base, followed by an obscure pallid annulus, below which the red is feebly infuscated, the spines black on their apical half, ten to eleven, rarely nine, in number in the outer series. Extremity of male abdomen strongly clavate, much recurved, the supraanal plate triangular, with an acutangulate or rectangulate apex, slightly angulate sides which are considerably and gradually elevated, and a tolerably broad, percurrent, moderately deep but apically fading median sulcus, broadened at extreme base, lying between sharp walls; furcula consisting of a pair of approximate denticulations of varying length, but generally at least as long as the last dorsal segment, generally slenderer than represented in the figure; cerci coarse and heavy, broad at base, rapidly narrowing, so that the middle is about two-thirds as broad as the extreme base, beyond enlarging slightly, curved rather abruptly inward, and strongly and abruptly compressed or exteriorly sulcate, the apex rounded subtruncate; subgenital plate rather broad and full, the lateral margins arcuate, the apical margin gently elevated but not tuberculate, entire, both margins together as seen from above subsemicircular.

Length of body, male, 23 mm., female, 24 mm.; antennae, male, 14 mm., female, 10 mm.; tegmina, male, 9.5 mm., female, 8.5 mm.; hind femora, male, 15 mm., female, 13.5 mm.

Twenty-one males, 16 females. Nebraska, Dodge; Fort Robinson, Dawes County, Nebraska, August 22, L. Bruner (U.S.N.M.—Riley collection); Omaha, Douglas County, Nebraska (L. Bruner; U.S.N.M.—Riley collection); St. Louis, Missouri, October 10, 27 (U.S.N.M.—Riley collection); Moline, Rock Island County, Illinois, McNeill; Putnam County, Indiana, June 30, October 21 (W. S. Blatchley; A. P. Morse); Vigo County, Indiana, Blatchley (A. P. Morse). It has also been reported from Iowa (Osborn).

According to Blatchley and Bruner it is found in woods. Bruner's specific name for this insect is preoccupied by Thomas.

105. MELANOPLUS TEXANUS.

(Plate XXII, fig. 1.)

Pezotettix texanus SCUDDER!, Proc. Bost. Soc. Nat. Hist., XX (1879), pp. 80-81; Cent. Orth. (1879), pp. 69-70.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.

Pezotettix scudderi BRUNER!, Bull. Washb. Coll., I (1885), p. 136.

Of moderately large size. Head hardly prominent, the vertex tumid, a little elevated above the pronotum, the interspace between the eyes half as broad again (male) or twice as broad (female) as the first antennal joint; fastigium rather steeply declivent, so shallow as to be hardly perceptible, broad, enlarging, and well rounded apically; frontal costa moderate, rather prominent, equal, plane, nowhere sulcate excepting at and for a short distance below the ocellus and slightly, as broad as the interspace between the eyes, delicately punctate throughout; eyes moderately large, moderately and similarly prominent in the two sexes, a little longer than the infraocular portion of the genae; antennae five-sevenths (male) or two-thirds (female) as long as the hind femora. Pronotum very simple, nearly equal, enlarging a little on the metazona (male) or enlarging posteriorly to a considerable extent and uniformly throughout (female), the front margin scarcely convex (male) or truncate (female), the hind border very broadly angulate; median carina distinct and abrupt but slight and equal, the lateral carinae subobsolete; prozona distinctly longitudinal (male) or longitudinally subquadrate (female), about a third longer than the very faintly rugulose metazona. Prosternal spine long, subconical, mesially enlarged, blunt, a little retrorse; interspace between mesosternal lobes twice or more than twice as long as broad (male) or subquadrate, by exception half as long again as broad (female). Tegmina abbreviate, overlapping, produced ovate, about as long as the head and pronotum together, nearly twice as long as broad, the inner margin rather gently the costal margin considerably convex, the tip roundly pointed. Fore and middle femora somewhat tumid in the male. Extremity of male abdomen clavate, considerably recurved, the supraanal plate triangular, a very little broader than long, pointed, the sides nearly straight; furcula consisting of a pair of slight but broad, depressed, angular teeth, their points as far apart as the width of one of them; cerci rather broad and straight, broadly and roundly constricted in the middle, the extremity truncate and rounded, the whole directed toward the apex of the subgenital plate and curved considerably inward; subgenital plate bluntly subconical, the margin quadrate, the apical margin a little elevated, recurved, and entire.

The general color is a dull somewhat cinereous brown above, a dirty but rather pale greenish brown below, marked conspicuously by a very broad straight piceous belt, scarcely broader behind than in front, extending from the eyes across the prozona, its upper edge at the

lateral carinae; antennae pale red, apically infuscated. The upper surface of the body and the tegmina are more or less profusely dotted with very pale fuscous; an oblique, cuneiform, yellow dash, the apex in front and above, follows the ridge of the metathoracic episterna, margined on either side by an equal piceous belt. The hind femora generally partake of the color of the upper surface of the body, but appear darker from being specked with blackish fuscous dots, which generally cluster more or less into two very oblique bands in the middle and beyond the middle, and also margin interruptedly the upper outer carina; hind tibiae red, the apical half of the spines black, these eleven to thirteen, generally eleven, in number in the outer series.

Length of body, male, 23.5 mm., female, 31 mm.; antennae, male, 10 mm., female, 11 mm.; tegmina, male, 7.6 mm., female, 10 mm.; hind femora, male, 14 mm., female, 17 mm.

Five males, 12 females. Texas, Belfrage (U.S.N.M.—Riley collection); Fort Worth, Tarrant County, Texas, May (same); Dallas, Texas, Boll (same; S. H. Scudder); Labette County, Kansas, W. S. Newlon (L. Bruner).

24. PLEBEJUS SERIES.

In this somewhat homogeneous group, the prozona is distinctly longitudinal in both sexes (the female of one species is not known) and nearly or quite half as long again as the metazona, the posterior margin of which is subtruncate or truncate or sometimes very obtusangulate. The interspace between the mesosternal lobes in the male is more than twice, sometimes thrice, as long as broad. The tegmina are very variable; one species is dimorphic, having either fully developed tegmina and wings considerably surpassing the tips of the hind femora, or ovate lanceolate overlapping tegmina, acuminate at tip and a little longer than the pronotum; another is macropterous with subequal tegmina, reaching the tips of the hind femora; the other species are brachypterous, but the tegmina are variably shaped,—sometimes as in the brachypterous form of the dimorphic species, at others either rounded ovate and attingent, or widely separated and lateral.

The supraanal plate is triangular, with generally a tolerably plane surface; the furcula is obsolete, subobsolete, or reduced to mere brief denticulations; the cerci are long, constricted in the middle, but expanding only a little apically, incurved, and bluntly rounded or inferiorly subacuminate at tip; the subgenital plate is always small, distinctly narrower than long, often narrowing apically, and sometimes ends in a tubercle.

There are five species, most of them widely separated from one another; one occurs in the upper Mississippi valley from the Dakotas to Kentucky, while the others are found respectively in Florida (two species), Texas, and California.

106. MELANOPLUS PLEBEJUS.

(Plate XXII, fig. 2.)

Pezotettix plebejus STÅL, Bih. K. Sv. Vet.-Akad. Handl., V, No. 9 (1878), p. 12.*Pezotettix pupaeformis* SCUDER!, Proc. Bost. Soc. Nat. Hist., XX, (1879), pp. 83-84; Cent. Orth. (1879), pp. 72-73.—RUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.

Of medium or slightly above medium size. Head not prominent, the vertex feebly tumid, scarcely elevated above the pronotum, the interspace between the eyes half as broad again (male) or twice as broad (female) as the first antennal joint; fastigium rather steeply declivent, broad, shallow, enlarging slightly in front, the bounding walls low and rounded; frontal costa moderate, equal, as broad as (male) or slightly narrower than (female) the interspace between the eyes, flat, sunken a little at the ocellus, and in the female sulcate below it, biserially punctate above; eyes large, rather prominent, very much longer, especially in the male, than the infraocular portion of the genae; antennae fully two-thirds (male) or a little more than one-half (female) as long as the hind femora. Pronotum simple, equal, the front margin a little full, the hind margin gently angulated; median carina distinct though rather slight, equal; lateral carinae rounded off; prozona faintly and distantly, metazona abundantly but not deeply punctate; prozona distinctly longitudinal and similar in the two sexes, fully half as long again as the metazona. Prosternal spine large, long, subcylindrical, blunt, a little retrorse; interspace between mesosternal lobes three times (male) or one and a half, rarely two, times (female) as long as broad. Tegmina abbreviate, overlapping, obovate, about as long as the pronotum, less than twice as long as broad, the curves of the costal and inner margins similar, the tip acutangulate. Male abdomen long and slender, the extremity clavate, somewhat recurved, the supraanal plate triangular, sharply pointed, fully as long as broad, the sides straight; furcula consisting of a pair of minute, rounded, approximate, flattened lobes, as long as broad; cerci with the basal half tapering by the rapid sloping of the upper edge so as to be half as broad in the middle as at base, beyond broadening again somewhat on the same side, so that the apical half is subspatulate, continuous with the basal part but strongly incurved, externally deeply channeled, the tip broadly rounded, the whole about as long as the last joint of the fore tarsi; subgenital plate very small and narrow, tumid, apically subtuberculate, the apical margin slightly elevated, entire.

The general color is a griseous brown, excepting the abdomen which is brownish testaceous; beneath clay yellow; the antennae are yellow at the base, darkening beyond to fuscous ferruginous; from behind the eye a broad black band extends across the prozona, generally enlivened on the genae by an oblique yellow streak, which in the

female narrowly traverses the lateral lobes of the pronotum nearly or quite to the lateral carinae; the tegmina are of the color of the disk of the pronotum and immaculate. Hind femora clay yellow more or less infuscated and with a pair of often obscure blackish bars; hind tibiae glaucous, pallid at base, with a blackish annulus, the spines pallid in basal black in apical half, twelve to thirteen, generally twelve, in number in the outer series.

Length of body, male, 21.5 mm., female, 23 mm.; antennae, male, 8.5 mm., female, 7.5 mm.; tegmina, male, 6 mm., female, 6.5 mm.; hind femora, male, 12.5 mm., female, 14 mm.

Nine males, 13 females. Texas, Belfrage, Lincecum (U.S.N.M.—Riley collection; S. H. Scudder); Dallas, Texas, Boll (same; L. Bruner).

This species resembles *M. flabellatus* in general appearance.

107. MELANOPLUS GRACILIS.

(Plate XXII, fig. 3.)

Pezotettix gracilis BRUNER!, Can. Ent., VIII (July, 1876), p. 124; *ibid*, IX (1877), p. 144.—SCUDDER, Can. Ent., XII (1880), p. 75.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.—BLATCHLEY!, Can. Ent., XXIII (1891), p. 81.—MCNEILL, Psyche, VI (1891), p. 76.—OSBORN, Proc. Iowa Acad. Sc., I, Pt. II (1892), p. 117.—BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 27.—GARMAN, Orth. Ky. (1894), p. 7.—BLATCHLEY, Can. Ent., XXVI (1894), p. 233.

Pezotettix minutipennis THOMAS!, Bull. Ill. Mus. Nat. Hist., I (December, 1876), p. 66.—SCUDDER, Can. Ent., XII (1880), p. 75.—THOMAS, Rep. Ent. Ill., IX (1880), pp. 90, 95, 119-120.

A little below the medium size, brownish testaceous above, luteo-flavous beneath, the whole tinged with green, with bright green hind legs. Head hardly prominent, luteo flavous, generally tinged with green and somewhat embrowned, above brownish testaceous with a greenish tinge, sometimes separated by a distinct slender flavous stripe from the broad piecous postocular band; vertex scarcely at all tumid, not at all elevated above the pronotum, the interspace between the eyes scarcely broader than (male) or nearly twice as broad as (female) the first antennal joint; fastigium strongly declivent, distinctly (male) or very feebly and broadly (female) sulcate; frontal costa prominent, pereurrent, equal, as broad as the interspace between the eyes, feebly sulcate at and below the ocellus, biserially punctate above; eyes moderate in size, moderately (female) or very (male) prominent, considerably longer than the infraocular portion of the genae; antennae luteous, feebly infuscated apically, more than four-fifths (male) or a little more than two-thirds (female) as long as the hind femora. Pronotum subequal, faintly enlarging posteriorly, above brownish testaceous, the lateral lobes with a very broad and conspicuous piecous pereurrent postocular belt above, sometimes enfeebled on the metazona, below varying from bright flavous to flavo-testaceous, the disk very broadly subtectate, passing by an abrupt but rounded shoulder, forming feeble

percurrent lateral carinae, into the vertical lateral lobes; median carina low but distinct, percurrent, equal; front margin faintly convex, hind margin subtruncate, mesially distinctly but weakly emarginate; prozona sparsely and shallowly punctate, distinctly longitudinal in both sexes, nearly twice as long as the finely and densely punctate metazona. Prosternal spine large, conical, blunt, suberect; interspace between mesosternal lobes twice as long as broad (male) or quadrate (female). Tegmina abbreviate, about the length of the prozona, lateral, lanceolate, the costal margin convex, the inner nearly straight, fully three times as long as broad, apically subacuminate, brownish fuscous. Fore and middle femora considerably tumid in the male; hind femora very slender, green, the whole geniculation blackish fuscous, the under surface flavous; hind tibiae green, with a basal, feeble, fuscous annulus, the spines black in the apical half, eleven to twelve in number in the outer series. Abdomen ferrugineo-fuscous, flavescent beneath, compressed, with a distinct median carina, the extremity of the male abdomen considerably clavate, much recurved, the supraanal plate short triangular with subrectangulate apex, nearly plane surface, and a not very deep percurrent median sulcus between low and rounded walls; furcula reduced to a pair of hardly noticeable approximate rounded lobules; cerci long clepsydral, moderately broad at extreme base, tapering regularly in the basal half so that the middle is less than half as broad as the base, beyond enlarging to a subspatulate compressed tip, angulate and faintly produced at the lower posterior extremity, the whole straight except for a faint incurving, and as long as the supraanal plate; subgenital plate small, narrowing apically so as to be hardly more than half as wide apically as at base, the lateral and apical margins in the same plane, well rounded as seen from above, entire.

Length of body, male, 14 mm., female, 19 mm.; antennae, male, 8.5 mm., female, 7.75 mm.; tegmina, male, 3 mm., female, 4 mm.; hind femora, male, 10 mm., female, 11.25 mm.

Twenty-nine males, 39 females. Denison, Crawford County, Iowa, July 20, J. A. Allen; Dallas County, Iowa, August 8-10, September 1-3, J. A. Allen; Nebraska, Dodge; Omaha, Douglas County, Nebraska (U.S.N.M.—Riley collection; L. Bruner); St. Louis, Missouri, July, October 27 (U.S.N.M.—Riley collection); Vigo, Putnam and Fulton counties, Indiana (W. S. Blatchley; A. P. Morse).

It has also been reported from Dakota (Bruner), Illinois—Rock Island, McLean and Champlain counties (Thomas, McNeill), and Kentucky—Webster and Fayette counties (Garman).

This is a sylvan species. Allen found it "abundant in grassy groves" in Iowa, Blatchley finds it in Indiana "on the iron weeds (*Vernonia fasciculata*) which grow abundantly in low open woods," and McNeill speaks of it in Illinois as a wood-loving species. It may be found full grown from the first of July to the middle of November.

108. MELANOPLUS INOPS, new species.

(Plate XXII, fig. 4.)

Of medium size, brownish fuscous. Head not prominent, ferrugineo-testaceous, very heavily punctate with fuscous above the clypeus, the summit dark brownish fuscous; vertex very feebly tumid, elevated a little above the level of the pronotum, but not above the upper level of the eyes, the interspace between the latter of the same width as the first antennal joint; fastigium strongly declivent, feebly and broadly sulcate; frontal costa percurrent, equal, fully as broad as the interspace between the eyes, scarcely sulcate at and below the ocellus, sparsely and feebly punctate; eyes large, very prominent, nearly twice as long as the infraocular portion of the genae; antennae (?). Pronotum feebly enlarging from in front backward, a broad, piceous, percurrent, postocular band occupying more than the upper half of the lateral lobes, below which these are ferrugineo testaceous, the disk broadly convex and passing by a well-rounded shoulder nowhere forming lateral carinae into the vertical lateral lobes; median carina slight, equal, percurrent; front margin faintly convex, feebly margined, hind margin subtruncate, very feebly convex, mesially faintly emarginate; prozona sparsely, coarsely, and shallowly punctate, distinctly longitudinal, fully half as long again as the finely, densely, and rather shallowly punctate metazona. Prosternal spine of moderate length, strongly appressed cylindrical, subtruncate; interspace between mesosternal lobes more than twice as long as broad. Tegmina abbreviate, nearly as long as the pronotum, attingent or subattingent, rotundato-ovate, broadly rounded apically, about half as long again as broad, brownish fuscous. Fore and middle femora a little tumid; hind femora moderately slender, ferrugineo-fuscous above, graduating into dull flavous below, without fasciation, the upper half of the genicular are fuscous; hind tibiae pale dull green, growing gradually dingy luteous basally, the whole basal half feebly infuscated, the spines black beyond their base, eleven in number in the outer series. Abdomen ferruginous, the extremity in the male strongly clavate, much recurved, the supraanal plate broad triangular, nearly plane, with a short and narrowing shallow median sulcus; furcula obsolete; cerci moderately large, compressed, moderately broad at base, narrowing on basal third, the middle third subequal and about two-thirds as broad as the base, the apical third again expanding slightly, well rounded and slightly tumid at tip, the whole feebly curved upward and more distinctly inward; subgenital plate small, subconical, the apical margin gradually and feebly elevated above the lateral, the apex tumid, forming a sort of blunt, coarse, rounded tubercle, hardly represented in the figure.

Length of body, male, 15 mm.; tegmina, 3.5 mm.; hind femora, 10.25 mm.

One male. Florida, Pridley (L. Bruner).

109. MELANOPLUS MARGINATUS.

(Plates I, fig. i; XII, fig. 5.)

Pezotettix marginatus SCUDDER!, Ann. Rep. Chief Eng., 1876 (1876), p. 504;
Ann. Rep. U. S. Geogr. Surv. 100th Mer., 1876 (1876), p. 284; BRUNER, Rep.
U. S. Ent. Comm., III, p. 59 (1883).

Eupreponemis occidentalis Bruner!, MS.

Of medium size, slender. Head not prominent, but slightly projecting, the face retreating more than usual, nearly at right angles with the not very steeply declivent fastigium; vertex very gently tumid, scarcely elevated above the pronotum, the interspace between the eyes a little broader than (male) or twice as broad as (female) the first antennal joint; fastigium rather deeply (male) or slightly (female) sulcate; frontal costa percurrent, equal, about as wide as the interspace between the eyes, shallowly sulcate at and below the ocellus, punctate throughout; eyes not very large, moderately prominent in the male only, a little longer, especially in the male, than the infraocular portion of the genae; antennae at least three-fourths (male) or about four-sevenths (female) as long as the hind femora. Pronotum rather long, the dorsum equal, with slightly sloping sides, distinct but rather slight and equal median carina, and distinct though very obtuse lateral carinae; hind border scarcely angulate. Prosternal spine rather small, bluntly subconical, a little retrorse; interspace between mesosternal lobes more than twice as long as broad (male) or a little longer than broad (female). Tegmina either surpassing considerably the hind femora, moderately broad, subequal beyond the basal expansion of the costa, well rounded apically (*M. m. amplus*, Plate I, fig. i), or slightly longer than the pronotum, ovate lanceolate, apically acuminate, overlapping, the costal margin very strongly arcuate, about twice as long as broad (*M. m. pauper*), brownish testaceous; wings a little shorter than the tegmina, ample, faintly infumate apically and anteriorly, the veins and cross veins black or blackish fuscous. Fore and middle femora considerably tumid in the male; hind femora rather slender, compressed; hind tibiae with eleven to thirteen spines in the outer series. Extremity of male abdomen clavate, somewhat recurved, the supraanal plate triangular, the apex acutangulate but blunt, the surface tectate with a moderately deep and narrow median sulcus in the basal two-thirds; furcula consisting of a pair of slight but coarse approximate denticulations; cerci straight, rather stout, moderately long, noticeably but broadly constricted in the middle, the tip larger than the base, gibbous, the whole scarcely depressed, curving slightly downward beyond the middle; subgenital plate small, subconical, ending in a minute tubercle.

General color dull pale olivaceous brown, slightly darker above, with a broad black stripe, occasionally obsolescent, extending from behind the eye along the upper half of the lateral lobes of the prozona; pleura

sometimes marked with black and the abdomen with a lateral black band, sometimes continuous and equal, sometimes confined to small triangular spots on the anterior segments; hind femora sometimes a little infuscated externally, the genicular lobes sometimes blackish, the hind tibiae rather dark olivaceous, the apical half of the spines black. The summit of the head is sometimes marked with black in broad median and diverging supraorbital stripes.

Length of body (*M. m. amplus*), male, 17.5 mm., female, 22 mm.; antennae, male, 8 mm., female, 7 mm.; tegmina, male, 15 mm., female, 18 mm. (est.); hind femora, male, 10 mm., female, 12.5 mm. Length of body (*M. m. pauper*), male, 14.5 mm., female, 20 mm.; antennae, male, 6 mm., female, 6.25 mm.; tegmina, male, 4.5 mm., female, 5.5 mm.; hind femora, male, 8 mm., female, 11 mm.

Nine males, 8 females. California (U.S.N.M.—Riley collection); Natoma vineyard, Folsom, Sacramento County, California, April, C. H. Dwinell (same); Atwater, Merced County, California, July 27, D. W. Coquillett (same); southern California, H. W. Henshaw; Fort Tejon, California, July 26, H. W. Henshaw.

The National Museum contains a male and female of the different forms taken *in coitu*.

110. MELANOPLUS PAROXYOIDES, new species.

(Plates I, fig. *k*; XXII, fig. 6.)

Of rather small or medium size, ferrugineo-testaceous, with a marked black postocular band. Head not prominent, more or less olivaceous-luteous, clouded with fuscous on face and genae, with fuscous stripes above, and a black postocular band; vertex very gently tumid, not elevated above the level of the pronotum, the interspace between the eyes narrow, not (male) or scarcely (female) wider than the first antennal joint; fastigium rather rapidly declivent, shallowly (male) or very shallowly (female) sulcate throughout; face retreating more than usual, the frontal costa rather prominent above, percurrent, equal, fully as broad as the interspace between the eyes, sulcate excepting above, strongly punctate; eyes rather large, prominent in the male, very much longer than the infraocular portion of the genae; antennae luteous or rufoluteous, about five-sixths (male) or two-thirds (female) as long as the hind femora. Pronotum long, subequal, hardly enlarging posteriorly even on the metazona, the upper portion of the lateral lobes with a broad solid black band crossing the prozona, and sometimes in a diffused form the metazona, below which the lateral lobes are more or less obscurely luteous; disk pilose, transversely broadly convex, separated from the inferiorly vertical lateral lobes by a rounded shoulder, nowhere forming lateral carinae; median carina uniform, percurrent; front margin subtruncate, hind margin obtusangulate; prozona distinctly longitudinal especially in the male, fully a fourth longer than the finely and

densely punctate metazona. Prosternal spine long, cylindrical, slightly retrorse, in the male bluntly pointed, in the female bluntly rounded and slightly appressed; interspace between mesosternal lobes about three times as long (male) or half as long again (female) as broad, the metasternal lobes attingent (male) or approximate (female). Tegmina not quite reaching the tips of the hind femora, moderately broad, tapering only in the apical third, brownish testaceous and immaculate (male) or feebly maculate along the discoidal area (female); wings moderately broad, hyaline with blackish fuscous veins, lighter colored in the anal area. Mesothoracic epimera black, separating the mostly luteous bordering episterna. Fore and middle femora somewhat tumid in the male; hind femora slender, luteo-testaceous with an olivaceous tinge, more or less ferruginous above, the outer face often more or less minutely clouded irregularly with fuscous, the inner half of the upper face thrice spotted with black, besides the black geniculation, the under surface luteous or flavous; hind tibiae glaucous, the base lutescent with a fusco-glaucous annulation, the spines black with pallid base, eleven to thirteen, usually twelve, in number in the outer series. Extremity of male abdomen a little clavate, somewhat recurved, the supraanal plate subtriangular with sinuous sides, broadly elevated margins, feebly acutangulate apex, and brief, triangular, basal, median sulcus, bounded by elevated ridges which meet in the center of the plate; furcula consisting of a pair of adjacent, parallel, brief, blunt denticulations overlying the median sulcus of the supraanal plate; cerci long and slender, broadly and mesially constricted, apically spatulate, gradually and considerably incurved, the external surface of the apical portion in no way sulcate but rather tumid, the tip attaining the extremity of the supraanal plate; infracercal plates broad, rapidly narrowing, as long or almost as long as the supraanal plate; subgenital plate very narrow, subequal, the apical margin in no way elevated or flaring, well rounded, entire.

Length of body, male, 18.5 mm., female, 27.5 mm.; antennae, male, 10 mm., female, 10.25 mm.; tegmina, male, 13 mm., female, 17.5 mm.; hind femora, male, 11.75 mm., female, 15 mm.

Three males, 4 females. Key West, Florida, Morrison; Tallahassee, Florida, December, F. H. Snow (University of Kansas).

This species is very distinct from any other known to me, and reminds one strongly of *Paroxya*.

25. COLLINUS SERIES.

This is a tolerably homogeneous group, in which the prozona of the male is quadrate or nearly so, varying from a little longitudinal (in one species distinctly longitudinal) to a little transverse, and the interspace between the mesosternal lobes in the same sex ranges from a little longer than broad to twice as long as broad. The tegmina are always fully developed, rarely do not surpass the hind femora, and are more

or less, generally rather vaguely, maculate or blotched. The hind tibiae are either red or green, usually the former, and have ten to fourteen spines in the outer series.

The supraanal plate is pretty regularly triangular, the apex never obtusangulate and generally has a median transverse ridge of greater or less distinctness. The furcula is generally a mere triangular tooth shorter than the last dorsal segment, but in one species is wanting and in others forms a pair of slender spines a little longer than the last dorsal segment. The cerci are of moderate width and invariably forked more or less distinctly, sometimes the upper, sometimes the lower fork the longer, or they have a strongly angulate median process beneath, which stands for an inferior branch. The subgenital plate is variable, but is generally rather broad (but sometimes very narrow) and generally a little, in one species greatly, elevated apically.

The species, nine in number, are of small or medium size, occasionally a little above the medium. Some species or other of the group has been reported from every part of the United States excepting Alaska and California, and is known also from the immediately neighboring parts of the Dominion of Canada west of the Great Lakes, but none have been reported from Ontario or Quebec, where they doubtless exist, nor from the Lower Mississippi Valley, where they also probably occur; nor is a single species known from any part of Mexico.

III. MELANOPLUS ALPINUS, new species.

(Plate XXII, fig. 7.)

Melanoplus alpinus BRUNER!, MS.

Of rather small size, brownish fuscous, more or less ferruginous above, luteo-testaceous below, with a distinct piceous postocular band. Head feebly prominent, luteo-testaceous, sometimes with an olivaceous tinge more or less deeply infuscated above, sometimes confined to two oblique stripes on either side, the outer following the margin of the eye and confluent with the postocular piceous band; vertex gently tumid, elevated a little above the level of the pronotum, the interspace between the eyes nearly twice (male) or fully thrice (female) as broad as the first antennal joint; fastigium rather strongly declivent, shallowly (male) or scarcely and broadly (female) sulcate; frontal costa nearly or quite percurrent, subequal, scarcely narrower than the interspace between the eyes, sulcate at and sometimes below the ocellus, biserially punctate above; eyes moderate, not prominent, about as long as the infraocular portion of the genae; antennae luteous or rufous, more or less feebly infuscated apically, about two-thirds (male) or half (female) as long as the hind femora. Pronotum rather short, feebly expanding posteriorly, the disk more or less ferruginous, the lateral lobes luteous on the prozona, except the broad, piceous, almost unbroken band across the upper half; disk broadly convex, passing into the ver-

tical lateral lobes by a distinct but rounded shoulder, sometimes forming feeble blunt lateral carinae, especially on the metazona; median carina distinct and sharp on the metazona, less distinct and in the female sometimes subobsolete on the prozona; front margin truncate, hind margin bluntly obtusangulate; prozona transverse, rarely quadrate or subquadrate, slightly longer in the male than in the female, at least a fourth (male) or scarcely (female) longer than the finely but obscurely punctate metazona. Prosternal spine short, very blunt conical, erect or suberect, feebly (male) or strongly (female) appressed; interspace between mesosternal lobes fully twice as long as broad (male) or quadrate (female). Tegmina reaching, rarely surpassing, the tips of the hind femora, of normal width and form, brownish fuscous, distinctly but not heavily maculate along the discoidal area, rather more distinctly in the female than in the male; wings moderately broad, hyaline, the veins pale fuscous, deepening apically and anteriorly. Fore and middle femora very little tumid in the male; hind femora of normal length, above and within bimaculate with fuscous, which is ordinarily confined in extent, but when extended takes on the form of very oblique fasciations, developed more on the inner than on the outer face, the latter luteo-testaceous more or less infuscated especially along the upper margin, beneath and on lower half of inner face luteous or flavous; the genicular arc fuscous; hind tibiae variable, red, yellow, or green, but always pale and rather dull in tint, the spines black beyond the base, ten to twelve, usually eleven, in number in the outer series. Extremity of male abdomen clavate, recurved, the supraanal plate triangular, the apex acutangulate, the surface nearly plane, with a shallow median sulcus on the basal three-fourths, formed by parallel and at last united, not very high, rounded, bounding ridges; furcula consisting of a pair of approximate, feeble, triangular denticulations overlying these ridges; cerci gently arcuate inward, consisting of a stout, tumid, very rapidly narrowing basal portion, a short, subcylindrical, median stem, and an apical furcation which develops two flanges: an upper, inward directed brief finger, hardly longer than broad and blunt tipped; and a long, downcurved, tapering, pointed apophysis, angulate on its upper margin and reaching far beyond the supraanal plate to the base of the apical elevation of the subgenital plate; the latter moderately broad and equal except for the extreme and abrupt apical elevation of the margin, forming, as viewed from behind, a quadrate truncate plate, mesially appressed, rising above the lateral margins of the plate.

Length of body, male, 22 mm., female, 24 mm.; antennae, male, 7.5 mm., female, 6.25 mm.; tegmina, male and female, 16 mm.; hind femora, male, 10.5 mm., female, 13 mm.

Thirteen males, 11 females. British Columbia, Crotch (Museum Comparative Zoology); Fort McLeod, Alberta, August, L. Bruner

(U.S.N.M.—Riley collection; S. H. Scudder); Henry Lake, Idaho, August, Bruner (same). Since this was written, Mr. C. F. Baker has sent me specimens from Fort Collins, Colorado, and from Morris Ranch, Larimer County, Colorado, 8,500 feet.

112. MELANOPLUS INFANTILIS.

(Plate XXII, fig. 8.)

Melanoplus infantilis SCUDDER¹, Proc. Bost. Soc. Nat. Hist., XX (1879), pp. 65-67; Cent. Orth. (1879), pp. 54-56.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 60; Can. Ent., XVII (1885), p. 17.—CAULFIELD, Rep. Ent. Soc. Ont., XVIII (1886), p. 71.—BRUNER, Rep. U. S. Ent., 1885 (1886), pp. 303, 307; Publ. Nebr. Acad. Sc., III (1893), p. 28.

One of the smallest if not the very smallest macropterous species of *Melanoplus* known. The general color is a dark griseous, the vertex of the head marked in black and dull yellow in a somewhat radiate fashion, the whole face and sides of head brownish olive or sordid yellow, flecked more or less abundantly with black; the antennae are pale dirty yellow, becoming infuscated toward the tip; behind the eye is a broad black band, often edged with yellow above, which also traverses the upper half or less of the lateral lobes, confined to the prozona, and is often enlivened by a small pale quadrate patch in the center of the lobes; the rest of the latter varies from yellow to brown, palest next the margins; the upper surface of the pronotum varies a good deal, but is usually griseous, often with a median belt of dirty yellow or ferruginous, edged on the front of the metazona by a pair of oblique, crescentic, longitudinal or converging patches of black. Tegmina cinereous, with alternate minute blocks of yellow and blackish fuscous in the discoidal area, apically changing to scattered quadrate fuscous dots. Hind femora below straw-yellow, above dark brown, with a pair of conspicuous, very oblique pale bars at the middle and next the base; hind tibiae pale glaucous, occasionally with a faint rufous tinge, becoming paler next the base and straw-yellow at the tip, the spines more or less heavily black-tipped, ten to eleven, rarely twelve, in number in the outer series; hind tarsi yellowish.

Head rather large, but not elevated, and moderately arched; interspace between the eyes scarcely broader than the first antennal joint (male) or broader than the length of the same (female); fastigium steeply declivent, deeply and roundly (male) or shallowly and flatly (female) sulcate, the lateral margins blunt and either slightly (female) or distinctly (male) divergent and then anteriorly convergent; frontal costa broad, nearly equal, slightly broader below than above, tumid (female) or flat (male) above, with a row of puncta on either side, narrowly and rather slightly sulcate at and just below the ocellus; eyes rather large, moderately prominent, a little longer than (male) or about as long as (female) the infraocular portion of the genae;

antennae about three-fourths (male) or over two-thirds (female) as long as the hind femora. Pronotum rather uniform, subequal, the metazona broadening slightly, especially in the male, subpunctate; median carina distinct throughout, but much slighter on the prozona than on the metazona; lateral carinae tolerably distinct throughout, but blunt; transverse sulci of prozona distinct throughout, unusually sinuous, not severing the median carina; prozona transverse, occasionally in the male subquadrate, distinctly longer than the metazona. Prosternal spine short, stout, erect, conico-cylindrical, appressed, more so in the female than in the male; interspace between mesosternal lobes half as long again as broad (male) or transverse, but narrower than the lobes (female). Tegmina attaining, generally surpassing a little, the tips of the hind femora, slender, feebly tapering. Extremity of male abdomen clavate, a little recurved, the supraanal plate rounded triangular, the extreme apex excised, fully as broad as long; furcula reduced to a pair of minute and blunt triangular teeth; cerci thickened and tumid at base, immediately narrowing to half the width and compressed, almost immediately broadening again, curving inward while they run backward and upward, and forking, the upper branch directed upward and inward, nearly as large as the basal expansion, subtriangular, a little longer than broad, compressed and apically rounded; the other arm much longer, nearly as long as the rest of the appendage, slender, tapering, but bluntly pointed and directed backward and inward, a little arched from beneath; subgenital plate narrow and equal except for the abrupt and considerable elevation of the extreme apical margin, which is mesially notched. Basal tooth of the lower valves of the ovipositor large, triangular, sharp, as long as broad.

Length of body, male 15.5 mm., female 20 mm.; antennae, male 6.25 mm., female 6.5 mm.; tegmina, male 10.5 mm., female 13 mm.; hind femora, male 8.75 mm., female 10.5 mm.

Forty-one males, 52 females. Medicine Hat, Assiniboia, September (U.S.N.M.—Riley collection); Fort McLeod, Alberta, September (same); Yakima River, opposite Ellensburg, Kittitas County, Washington, S. Henshaw (Museum Comparative Zoology); Salmon City, Lemhi County, Idaho, August (U.S.N.M.—Riley collection); Yellowstone, Montana, August (same); Mandan, Morton County, North Dakota (same); Douglas, Converse County, Wyoming, Bruner (same); Evanston, Uintah County, Wyoming, 6,800 feet, August 6; Cheyenne, Laramie County, Wyoming (L. Bruner); Colorado (U.S.N.M.—Riley collection); Colorado, 5,500 feet, Morrison; Florissant, El Paso County, Colorado, 8,000 feet, August 17–22; South Park, Colorado, 8,000 to 10,000 feet, August 11–16; Garland, Costillo County, Colorado, 8,000 feet, August 28–29; Fort Robinson, Dawes County, Nebraska, August 21–22, L. Bruner (U.S.N.M.—Riley collection).

It has also been reported from Regina, Assiniboia, by Caulfield.

113. MELANOPLUS MINOR.

(Plate XXII, fig. 9.)

Caloptenus minor SCUDDER!, Proc. Bost. Soc. Nat. Hist., XVII (1875), p. 478; Ent. Notes, IV (1875), p. 77; Ann. Rep. Chief Eng., 1876 (1876), p. 501; Ann. Rep. Geogr. Surv. 100th Mer. (1876), p. 281.—BRUNER, Can. Ent., IX (1877), p. 145.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 42.—SCUDDER!, Cent. Orth. (1879), p. 22.—DODGE, Rep. U. S. Ent. Comm., II (1881), App., p. 17.—BRUNER, *ibid.*, III (1883), p. 60; Bull. Div. Ent. U. S. Dep. Agric., IV (1884), pp. 57, 58.

Caloptenus occidentalis THOMAS!, Ann. Rep. Chief Eng., 1878 (1878), 1845.

Melanoplus minor SCUDDER, Cent. Orth. (1879), p. 84.—BRUNER, Can. Ent., XVII (1885), p. 17.—BLATCHLEY, *ibid.*, XXIII (1891), p. 81.—MCNEILL, Psyche, VI (1891), p. 74.—MORSE, *ibid.*, VI (1892), p. 250.—BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 28.—MORSE, Psyche, VII (1894), p. 53.—BEUTENMÜLLER, Bull. Amer. Mus. Nat. Hist., VI (1894), pp. 307-308.

Of medium size, dark-brownish fuscous, often with a ferruginous tinge, especially on the disk of the pronotum, luteous beneath. Head very feebly prominent, testaceous, obscurely mottled with fuscous at least above, where there is generally a broad, median blackish stripe and a postocular piceous band; vertex gently tumid, scarcely elevated above the pronotum, the interspace between the eyes nearly twice (male) or nearly thrice (female) as broad as the first antennal joint; fastigium steeply declivent, narrow, equal, deeply (male) or shallowly (female) sulcate, the lateral margins sharp; frontal costa percurrent, faintly narrowed next the antennae, elsewhere subequal, about as broad as the space between the eyes, shallowly sulcate at and below the ocellus; eyes moderately large, a little prominent, almost as long as the infraocular portion of the genae; antennae rufous, apically infuscated, about two-thirds as long as the hind femora, the proportions scarcely differing in the two sexes. Pronotum short, distinctly but not greatly expanding on the metazona, the postocular stripe of the lateral lobes extending over the prozona, broader and more distinct than on the head, the disk very broadly convex, passing into the subvertical lateral lobes by a distinct but always rounded shoulder nowhere forming lateral carinae; median carina slight, scarcely less distinct on the prozona than on the metazona, cut only by the principal sulcus; front margin truncate, hind margin obtusangulate; prozona longitudinally subquadrate, feebly more longitudinal in the male than in the female, distinctly longer than the finely punctate metazona. Prosternal spine not very long, conico-cylindrical, more or less appressed, suberect; interspace between mesosternal lobes half as long again as broad (male) or a little transverse (female). Tegmina reaching about to the tips of the hind femora, sometimes a little short of, sometimes surpassing them, rather slender and subequal, brownish fuscous, more or less distinctly but never heavily maculate with fuscous along the discoidal area; wings moderately broad, hyaline with the faintest possible bluish tinge, the

veins mostly fuscous. Fore and middle femora a little tumid in the male; hind femora luteo-testaceous, outside (excepting below) more or less deeply infuscated, the infuscation sometimes confined to, or more marked in, very oblique dusky fasciations, which also cross the upper face, the lower face generally dull orange; hind tibiae very variable but generally nearly uniform in color, pale red or glaucous being the prevailing color, but they are sometimes plumbeous or yellowish; spines black tipped, ten to twelve, usually eleven, in number in the outer series. Extremity of male abdomen clavate, feebly recurved, the supraanal plate triangular with acutangulate apex, the surface nearly flat with a narrowing, moderately deep, median sulcus between rather prominent ridges, which are confluent apically and terminate a little beyond the middle of the plate; furcula consisting of a pair of rather distant, parallel, slender spines, somewhat longer than the last dorsal segment, overlying the ridges of the supraanal plate; cerci with the basal portion stout, rectangular, not very strongly compressed, nearly twice as long as broad, the apical portion of the same shape but broadly rounded at the tip, nearly as long as the basal part, but narrower, bent from it upward at an angle of 45° , bent also inward, much compressed and shallowly sulcate, with an inferior bounding ridge; subgenital plate very short, subequal but apically rounded, the lateral margin somewhat infolded at base, the apical margin mesially angulate, thickened and feebly tuberculate.

Length of body, male, 19 mm., female, 24 mm.; antennae, male, 8 mm., female, 9 mm.; tegmina, male, 14 mm., female, 16.5 mm.; hind femora, male, 11.25 mm., female, 13 mm.

One hundred and seventy-three males, 119 females. Fryeburg, Oxford County, Maine, August 20 (A. P. Morse); Kearsarge village, North Conway, and Jackson, Carroll County, New Hampshire, July 2-30 (same); Faneuil Station, Boston, Massachusetts, July 14 (same); Sherborn, Belmont, and Natick, Middlesex County, Massachusetts, June 23-August 6 (same); Wellesley, Needham, Dover, and Blue Hill, Norfolk County, Massachusetts, June 13-August 4 (same); Winchendon, Worcester County, Massachusetts, June 30-July 5 (same); Thompson, Windham County, Connecticut, August 4, 6 (same); Montville and Niantic, New London County, Connecticut, August 7, 8 (same); Stamford, Fairfield County, Connecticut, August 13-17 (same); Croton, Delaware County, New York, June 26; Virginia, July (L. Bruner); Indiana, Bollman (U.S.N.M.—Riley collection); Illinois; Dallas County, Iowa, August 6, J. A. Allen; Jefferson, Greene County, Iowa, July 20-24, Allen; Crawford County, Iowa, July 13-24, on prairies, Allen; Brookfield, Linn County, Missouri, E. P. Austin; Nebraska, Dodge; Nebraska?, A. Agassiz (Museum Comparative Zoology); War Bonnet Canyon, Nebraska, L. Bruner (U.S.N.M.—Riley collection); Valentine, Cherry County, Nebraska, Bruner (same); Gordon, Sheridan County, Nebraska, Bruner (same); Boulder, Colorado, June (same); Poudre River, Colorado, July 16, Bruner (same); Colorado, 6,000 feet, Mor-

rison; Wyoming, Morrison (U.S.N.M.—Riley collection); Fort McKinney, Johnson County, Wyoming, July (same); Douglas, Converse County, Wyoming, Bruner (same); Harney's Peak, 7,000 to 8,000 feet, South Dakota, Bruner (same); Fort Buford, Williams County, North Dakota (same); Dakota (same); Montana, and Yellowstone, Montana (same); Minnesota; Winnipeg, Manitoba, Donald Gumm and R. Kennicott.

It is also reported by Bruner from Washington (State), and from Fort Collins, Larimer County, Colorado.

114. MELANOPLUS CONFUSUS, new species.

(Plate XXII, fig. 10.)

Of medium size, flavo-testaceous. Head not prominent, probably flavo-luteous in life, marked with fuscous above in a median stripe and a pair of divergent, posteriorly enlarging stripes, besides a broad, distinct, piceous, postocular band; vertex somewhat tumid, slightly elevated above the pronotum, the interspace between the eyes hardly so wide as¹ (male) or almost twice as wide as (female) the first antennal joint; fastigium gently declivent, deeply (male) or shallowly (female) sulcate; frontal costa subequal, but slightly broader below, about as broad as the interspace between the eyes, distinctly sulcate at and below the ocellus, biserially punctate above; eyes of moderate size and prominence, only slightly more prominent in the male than in the female, a little longer than the infraocular portion of the genae; antennae luteous, slightly infuscated next the apex, about two-thirds (male) or but little more than a half (female) as long as the hind femora. Pronotum with the prozona subequal except for the tumid sides, the metazona expanding considerably, the sides of the prozona with a broad, piceous, postocular band, which is sometimes a little maculate or strigose with luteous, the disk broadly convex and passing by a well-rounded shoulder, forming blunt lateral carinae on the metazona and extreme front of prozona, into the vertical lateral lobes; median carina distinct, subequal, percurrent; front margin truncate, with feeblest sign of minute emargination, hind margin obtusangulate; prozona distinctly longitudinal (male) or longitudinally subquadrate (female), very sparsely punctate, not a great deal longer than the finely and densely punctate metazona. Prosternal spine moderately long, compressed, blunt conical, feebly retrorse (male), or rather short, appressed conical, very blunt, erect (female); interspace between mesosternal lobes about half as long again as broad (male) or quadrate (female), the metasternal lobes approximate (male) or moderately distant (female). Tegmina long and rather slender, subequal, slightly or considerably surpassing

¹Undoubtedly wider in life, the exceptionally deep sulcation of the fastigium of the single male indicating a contraction of the intraocular space from drying after immersion in alcohol.

the hind femora, brownish fuscous, with a conspicuous, slender, alternating series of dark fuscous and luteous quadrate spots along the middle line; wings not very broad, hyaline, the veins fusco-luteous. Fore and middle femora very slightly enlarged in the male; hind femora slender, compressed, luteo-testaceous, very obscurely and on the sides obliquely bifasciate with fuscous, most distinctly on the upper face, the geniculation more or less infuscated; hind tibiae luteo-testaceous, the spines black beyond the base, ten to twelve in number in the outer series. Extremity of male abdomen clavate, a little recurved, the supraanal plate subtriangular with expanded base and feebly angulate sides, the apex subrectangulate, the apical third a little tumid and distinctly elevated above the median portion, the median sulcus deep, percurrent, narrow in the middle and expanded at both extremities; furcula consisting of a pair of adjacent, subparallel processes, each of which consists of a tumid base bearing an apical, equal, slender, arcuate projection hardly longer than the base; cerci with a subequal, rectangulate basal portion, straight but transversely arcuate, more than half as long again as broad, the upper apical corner of which is produced as a slightly twisted rounded subspatulate lobe, hardly longer than broad, incurved and exteriorly sulcate, about two-thirds as broad as the basal portion, which is thus rectangulate at its lower apical extremity; subgenital plate small, narrow, apically narrowed, the apical margin a little incrassate, entire, not elevated.

Length of body, male, 17 mm., female, 22 mm.; antennae, male, 8 mm., female, 7.5 mm.; tegmina, male and female, 15 mm.; hind femora, male, 11.75 mm., female, 13.5 mm.

One male, 3 females. Munsons Hill [Kentucky?], July 12 (Museum Comparative Zoology); Newport, Campbell County, Kentucky, C. M. Willard (same).

The single female from Newport is placed here with some doubt on account of its divergence from the others; and all the specimens have been dried after long immersion in alcohol, bleaching the colors to some extent, and contracting some of the parts.

115. MELANOPLUS ARIZONAE.

Melanoplus arizonae SCUDDER, Proc. Bost. Soc. Nat. Hist., XX (1879), pp. 64-65; Cent. Orth. (1879), pp. 53-54.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 60.

Of medium size. Head rather small, subcompressed, not elevated, moderately arched; eyes moderately prominent; interspace between the eyes as broad as the length of the basal antennal joint; fastigium very shallow, with moderately sharp but not prominent lateral walls, which give it a subspatulate form; frontal costa rather broad, above slightly tumid, with punctulate sides, scarcely broader below, sulcate at the ocellus and to some degree below it. Pronotum rather slender, rather uniform but distinctly broadening on the metazona, which is separated from the prozona by a considerable depression and a pretty deep sulcus; metazona rather distinctly punctate; median carina dis-

inct throughout though slight; lateral carinae obscure on the prozona, the middle of the prozona tumid on the upper half of the lateral lobes; transverse sulci of prozona distinct throughout, not severing the median carina. Tegmina considerably longer than the body. Supraanal plate of male (so far as can be seen on the single specimen in which the parts are somewhat concealed) semiovate, broadly rounded apically, longer than broad; the forks of the furcula slender, aculeate, parallel, approximate, about half as long as the supraanal plate; cerci of moderate size, compressed, the basal half tapering considerably, straight as seen laterally, directed backward, the apical half a little incurved, nearly equal, enlarging a little apically and notched at the tip; subgenital plate haustrate, rounded, entire. Basal tooth of lower valves of ovipositor sharp, triangular, as long as broad.

The specimens on which this description is based were collected in alcohol, and little can be said of their color; there is a more or less broken black postocular band crossing the prozona on the upper half of the lateral lobes; the hind femora may have been faintly banded, the hind tibiae were probably red, with black spines, and there is a distinct row of fuscous rectangular spots down the discoidal area of the tegmina, especially in the female.

Length of body, male, 21 mm., female, 22 mm.; antennae, male, 9 mm., female, 8 mm.; tegmina, male and female, 19 mm.; hind femora, male, 12.5 mm., female, 13.5 mm.

One male, 1 female. Arizona, Thomas.

I have never again seen the specimens on which this species was founded, nor any others that could be referred to it. Accordingly, with slight change in the phraseology, I reproduce the original description, to which I may add the following unpublished notes, taken while the specimens were still in my hands: The species has very much the same general appearance as *M. femur-rubrum*. It has, however, entirely different abdominal appendages, as may be seen above, and also slenderer tegmina, in the venation of which it closely resembles *M. keeleri*. The prosternal spine is not very large, but moderately stout and bluntly rounded at tip, a little appressed, and, on side view, not tapering; the mesosternal lobes are much as in *M. keeleri*. The median carina is more distinct on the metazona than on the prozona; the proportions of the prozona are as in *M. keeleri* and the whole pronotum almost precisely as in that species, with a little more rounded angle to the hind margin.

116. MELANOPLUS KEELERI.

(Plate XXIII, fig. 1.)

Caloptenus keeleri THOMAS!, Bull. U. S. Geol. Surv. Terr., I, No. 2 (1874), p. 69.—GLOVER, Ill., N. A. Ent., Orth. (1874), pl. XVII, fig. 1.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 42.—BRUNER, *ibid.*, III (1883), p. 60.

Melanoplus tenebrosus SCUDDER!, Proc. Bost. Soc. Nat. Hist. (1879), p. 63; Cent. Orth. (1879), p. 52.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 60.

Of medium size; above very dark, almost blackish brown, the male darker than the female; beneath dirty olive. Head not elevated, the

face more or less purplish, the genae flecked with yellowish green and with black; vertex moderately arched, feebly elevated above the pronotum, the interspace between the eyes a little broader than (male) or nearly twice as broad as (female) the first antennal joint; fastigium rather shallow, but with distinct blunt bounding walls, which have a subovate outline; frontal costa fully as broad as the interspace between the eyes, slightly compressed above, sulcate at and below the ocellus, laterally punctulate above; eyes rather prominent, a little longer than the infraocular portion of the genae; antennae reddish at the base, becoming more and more fuscous apically, about four-fifths (male) or two-thirds (female) as long as the hind femora. Pronotum pretty uniform, scarcely expanding on the metazona, which is only slightly separated from the prozona and is obscurely punctate; behind the eyes is a black band, which crosses the upper half of the lateral lobes of the prozona, but is not very distinct from the general infuscation of the prothorax; median carina slight, distinct only at the extreme front and on the metazona; lateral carinae tolerably distinct; transverse sulci of prozona slight, the anterior scarcely severing the median carina; front margin truncate, hind margin obtusangulate; prozona feebly longitudinal (male) or quadrate or transverse (female). Prosternal spine of moderate length, stout, conico-cylindrical, somewhat appressed, blunt, erect; interspace between mesosternal lobes nearly or quite twice as long as broad (male) or a little longer than broad (female). Tegmina reaching or somewhat surpassing the tips of the hind femora, moderately broad, distinctly tapering, very dark brown or blackish, especially in the male, rather inconspicuously maculate along the discoidal area; wings rather broad, hyaline, very faintly infumated in the apical half, the veins mostly dark fuscous. Fore and middle femora a little tumid in the male, reddish brown, infuscated above, especially at the apex; hind femora mostly blackish externally, with oblique, more or less broken, median and basal bands of dull testaceous, especially in the male, the geniculation black; hind tibiae red with a narrow basal black or blackish annulus, the spines black, eleven to fourteen in number in the outer series. Extremity of male abdomen a very little clavate, scarcely recurved, the supraanal plate rounded triangular, of about equal length and breadth; furcula reduced to a pair of slight, blunt tubercles; cerci small, compressed, the basal two-thirds straight, slightly tumid, directed backward, tapering slightly, the apical third forked, the forks at right angles, the upper generally twice as broad and half as long again as the lower (but the lower very variable in size), compressed, straight, but a little incurved, rounded at tip, the lower more nearly in the course of the basal portion, straight, bluntly tipped; subgenital plate rather broad, a little longer than broad, haustate, subquadrate, entire. Basal tooth of the lower valves of the ovipositor sharp, triangular, as long as broad.

Length of body, male, 22 mm., female, 25 mm.; antennae, male, 10.5 mm., female, 9.5 mm.; tegmina, male, 16.5 mm, female, 20.5 mm.; hind femora, male, 13 mm., female, 14 mm.

Sixteen males, 16 females. North Carolina, Morrison; Dingo Bluff, North Carolina, November 15, Parker-Maynard; Smithville, North Carolina, November 22, Parker-Maynard; Florida, Priddy (L. Bruner); Florida (U.S.N.M.—Riley collection); Jacksonville, Duval County, Florida, Ashmead (L. Bruner); Cadet, Washington County, Missouri, Riley (U.S.N.M.—Riley collection; S. H. Scudder); Dallas, Texas (same).

117. MELANOPLUS DELETOR.

(Plate XXIII, fig. 2.)

Caloptenus deletor SCUDDER!, Proc. Bost. Soc. Nat. Hist., XVII (1875), pp. 175-176; Ent. Notes, IV (1875), pp. 74-75; Cent. Orth. (1879), pp. 19-20.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 42.—BRUNER, *ibid.*, III (1883), p. 60.
Melanoplus deletor SCUDDER, Cent. Orth. (1879), p. 81.

Of moderately large size, brownish fuscous, darkest above. Head feebly prominent, olivaceo-testaceous, more or less heavily infuscated above in a pair of divergent, longitudinal stripes; vertex rather tumid, distinctly elevated above the pronotum, the interspace between the eyes scarcely broader than (male) or fully twice as broad as (female) the first antennal joint; fastigium steeply declivent, shallow, with slight but rather sharp lateral margins, greatly expanding anteriorly; frontal costa broad, expanding a little at the ocellus and a little sulcate in the same part; eyes rather large, not very prominent, somewhat longer than the infraocular portion of the genae; antennae pale reddish, infuscated apically, about four-fifths (male) or three fourths (female) as long as the hind femora. Pronotum faintly constricted in the middle, a little larger posteriorly than anteriorly, the disk more or less feebly striped with blackish fuscous, plano-convex, passing by an abrupt but rounded shoulder into the subvertical lateral lobes, which are luteo-testaceous with an olivaceous tinge, passing above more or less gradually into the postocular stripe; this crosses the prozona only, is always most distinct and deeper in tint at its upper limit, is sometimes confined to that and often more or less broken with luteous; median carina distinct but slight, nearly equal, cut only by the principal sulcus; front margin subtruncate, hind margin rounded obtusangulate; prozona longitudinal (male) or quadrate (female), distinctly longer than the obscurely punctate metazona. Prosternal spine short, stout, appressed cylindrical, blunt, erect, in the female somewhat conical; interspace between mesosternal lobes fully twice as long as broad (male) or quadrate (female). Tegmina fully reaching, generally somewhat surpassing the hind femora, rather broad, distinctly tapering, brownish fuscous, flecked throughout with fuscous, more conspicuously in the discoidal area from alternating with a line of pallid spots; wings

broad, hyaline, glistening, the veins fuscous only near extreme apex. Fore and middle femora distinctly tumid in the male, dull brownish, the middle femora blackish above, especially apically, all the tarsi marked with blackish; hind femora with the upper outer half blackish, sometimes broken into very oblique dashes by a median and post basal yellowish streak; hind tibiae red, with a narrow black basal annulus, the spines black beyond the base, eleven to thirteen in number in the outer series. Extremity of the male abdomen a little clavate, slightly recurved, the supraanal plate triangular, with broadly angulate, feebly and broadly elevated sides and subrectangulate apex, the median sulcus broad and deep, occupying only the basal half and inclosed between very high and sharp ridges, which apically diverge abruptly at right angles to the sulcus; furcula consisting of a pair of slight and distant denticulations lying just outside the base of the supraanal ridges; cerci long and slender, compressed, a little incurved, broadest at the base, uniformly and very slightly tapering on the basal half, beyond equal, bent a little upward, broadly and roundly truncate at tip, and emitting from the inferior angle a slender, compressed, scarcely tapering shoot, rounded at the tip, running in the direction of the upper margin of the basal half of the cerci and in the same general plane; subgenital plate rather broad, slightly longer than broad, the apical margin feebly elevated, broadly rounded and entire.

Length of body, male, 23.5 mm., female, 30.5 mm.; antennae, male, 11.5 mm., female, 12 mm.; tegmina, male, 21 mm., female, 22 mm.; hind femora, male, 14.5 mm., female, 16 mm.

Sixteen males, 21 females. San Antonio, Bexar County, Texas, May (U.S.N.M.—Riley collection); Bosque County, Texas, November 1, Belfrage (same; S. H. Scudder); Dallas, Texas, Boll (S. H. Scudder; U.S.N.M.—Riley collection; Museum Comparative Zoology); Agricultural College, Mississippi (H. E. Weed); Georgia, Morrison (U.S.N.M.—Riley collection; S. H. Scudder); Jacksonville, Duval County, Florida, Maynard (S. Henshaw).

This species is closely allied to the preceding smaller species, but may be distinguished from it by the points brought out in the table.

118. MELANOPLUS LURIDUS.

(Plate XXIII, fig. 7.)

Caloptenus luridus DODGE!, Can. Ent., VIII (1876), p. 11.—BRUNER, *ibid.*, IX (1887), p. 145.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 42.—RILEY, *ibid.*, I (1878), p. 220; Stand. Nat. Hist., II (1884), p. 195.

Melanoplus luridus BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 60; Bull. Washb. Coll., I (1885), p. 138; Rep. U. S. Ent., 1885 (1886), p. 307.—OSBORN, Proc. Iowa Acad. Sc., I, Pt. II (1892), p. 118.—BRUNER, Publ. Nebr. Acad. Sc. III (1893), p. 28.

Rather small in size, brownish fuscous, more or less ferruginous. Head not at all prominent, dull pallid testaceous, feebly flecked with fuscous, above with widening dull fuscous stripes and a narrow fuscous postocular band; vertex gently tumid, slightly or not elevated

above the pronotum, the interspace between the eyes scarcely wider than (male) or fully half as wide again as (female) the basal antennal joint; fastigium steeply declivent, plane, with well elevated and rounded lateral margins; frontal costa just failing to reach the clypeus, subequal, fully as broad as the interspace between the eyes, sulcate at and below the ocellus, biserially punctate above; eyes of moderate size, not prominent, shorter than the infraocular portion of the genae; antennae ferruginous, feebly infuscated apically, nearly five-sixths (male) or less than three-fourths (female) as long as the hind femora. Pronotum subequal, feebly and gradually enlarging posteriorly, the disk nearly plane, passing by distinct but abruptly rounded shoulders forming subobsolete lateral carinae into the vertical lateral lobes, which have only an obscure, rarely a distinct, dark postocular band, always limited to the prozona; median carina percurrent but blunt and a little obscure on the prozona; front border subtruncate, hind border obtusangulate, the angle well rounded; prozona slightly longitudinal (male) or quadrate (female), distinctly (male) or not (female) longer than the closely punctate metazona. Prosternal spine short, conical, blunt, erect, in the female a little appressed; interspace between mesosternal lobes a little longer than broad (male) or transverse, but distinctly narrower than the lobes (female). Tegmina reaching or a little surpassing the tips of the hind femora, moderately narrow, very gently tapering, brownish fuscous, scarcely or distinctly though feebly maculate in the proximal part of the discoidal area; wings moderately broad, hyaline, most of the veins fuscous. Fore and middle femora tumescent in the male; hind femora long and slender, luteo-testaceous, above rather broadly bifasciate with blackish fuscous, often confluent along the middle of the outer face and then more or less suffusing the whole face excepting below, which with the under surface is dull luteous, occasionally tinged more or less distinctly with orange, the sides of the geniculation almost wholly fuscous; hind tibiae red, rarely with a very narrow, basal, fuscous annulus, the apical half of the spines black, ten to twelve in number in the outer series. Extremity of male abdomen clavate, somewhat recurved, the supraanal plate triangular with slightly angulate sides, feebly acutangulate tip, and a large, equal, and deep median sulcus extending over the basal three-fourths of the plate, bounded by high and sharp ridges, buttressed in the middle of the plate by slight transverse ridges; fureula consisting of a pair of distant slight denticulations lying on the outer side of the base of the submedian ridges of the supraanal plate; cerci consisting of a straight basal piece, gently and slightly tapering, less than twice as long as the basal breadth, and a bifurcate apical portion, the bifurcation at right angles, each fork bearing a similar angular relation to the basal piece, the lower fork slight and tapering, about as long as the breadth of the basal piece, directed obliquely downward, the upper fork nearly as long as and about half as broad as the basal piece, equal, apically well rounded, directed obliquely upward and bent a very little inward;

subgenital plate broad, fully as broad as long, the apical margin abruptly slightly and equally elevated, entire, the whole margin of the plate as seen from above subquadrate.

Length of body, male, 19 mm., female, 27 mm.; antennae, male, 8.5 mm., female, 9.5 mm.; tegmina, male, 14 mm., female, 17 mm.; hind femora, male, 10.75 mm., female, 13.5 mm.

Sixteen males, 17 females. Dallas County, Iowa, August 8-10, J. A. Allen; Brookfield, Linn County, Missouri, E. P. Austin; Williamsville, Wayne County, Missouri, S. W. Denton (A. P. Morse); Nebraska, Dodge (U.S.N.M.—Riley collection; S. H. Scudder); West Point, Cuming County, Nebraska, August (U.S.N.M.—Riley collection; L. Bruner); Sidney, Cheyenne County, Nebraska, August (L. Bruner); Fort Robinson, Dawes County, Nebraska, August (same); Dakota (U.S.N.M.—Riley collection); Colorado, Morrison (S. Henshaw); Wyoming, Morrison (U.S.N.M.—Riley collection); Mason Valley, Esmeralda County, Nevada, June 30, A. S. Richardson (same); Easton, Kittitas County, Washington (same).

It is also reported from the vicinity of St. Louis, Missouri (Riley), Reno and Barber counties, Kansas (Bruner), and the Yellowstone region, Montana (Bruner).

119. MELANOPLUS COLLINUS.

(Plate XXIII, fig. 6.)

Melanoplus collinus SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1878), p. 285; Ent. Notes, VI (1878), p. 44.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 60.—FERNALD, Orth. N. Engl. (1888), pp. 31, 32; Ann. Rep. Mass. Agric. Coll., XXV (1888), pp. 115, 116.—SMITH, Cat. Ins. N. J. (1890), p. 413.—DAVIS, Ent. Amer., V (1889), p. 81.—BLATCHLEY!, Can. Ent., XXIII (1891), p. 99.—MCNEILL!, Psyche, VI (1891), p. 74.—SMITH, Bull. N. J. Exp. St., XC (1892), p. 34.—BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 28.—MORSE!, Psyche, VI (1893), p. 406; *ibid.*, VII (1894), p. 53.—BLATCHLEY!, Can. Ent., XXVI (1894), p. 244.—BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., VI (1894), pp. 306-307.

Medium or rather small sized, dark brownish fuscous, beneath more or less pale lemon-yellow. Head not prominent but rather large, the face and genae mottled with brownish purple and faint purplish white, the latter sometimes supplanted by an olivaceous tint, the summit with fuscous or purplish longitudinal streaks and a black postocular band edged above by purplish or yellowish; vertex rather tumid, distinctly elevated above the pronotum, the interspace between the eyes slightly broader than (male) or about half as broad again as (female) the first antennal joint: fastigium steeply declivent, shallowly sulcate, broadening considerably in front; frontal costa just failing to reach the clypeus. equal, of the same breadth as the interspace between the eyes, depressed at and generally sulcate below the ocellus, punctate throughout, biserially above; eyes moderately large, moderately prominent, a little longer than the infraocular portion of the genae, mottled with faintly purplish black and faintly purplish white; antennae ferruginous grow-

ing apically infuscated, about three-fourths (male) or two thirds (female) as long as the hind femora; clypeus, labrum and base of mandibles mottled like the face, the labrum edged with black; palpi pallid, streaked exteriorly with purplish brown, the last joint tipped with purplish black. Pronotum subequal, feebly and regularly enlarging posteriorly, the upper portion of the lateral lobes with a broad piceous band, occasionally obsolete, crossing the prozona, below which the lateral lobes have the mottling of the face; disk nearly plane, separated from the vertical lateral lobes by a bluntly angulate shoulder, almost forming a lateral carina; median carina distinct on the metazona, subobsolete on the prozona; front margin subtruncate, hind margin feebly obtusangulate, the angle rounded; prozona longitudinal (male) or quadrate (female), distinctly (male) or scarcely (female) longer than the closely punctate metazona. Prosternal spine short, blunt, conical, a little stouter in the female than in the male and appressed; interspace between mesosternal lobes about half as long again as broad (male) or transverse but much narrower than the lobes (female). Tegmina extending backward about as far as the hind femora, with flight variation, moderately broad, distinctly tapering, brownish fuscous, not infrequently somewhat cinereous, sprinkled with delicate fuscous maculation along the discoidal area; wings not very broad, hyaline, sometimes with a scarcely perceptible yellowish tinge to the anal area, the veins fuscous apically and anteriorly so as almost to give the tip an infumated appearance. Fore and middle legs tumescent in the male, mottled with the colors of the face; hind femora alternately marked externally with faint purplish brown, dark brown and very pale purplish, the inferior carina yellowish bordered with white, the under surface yellowish; hind tibiae coral red with a basal black annulation, the spines tipped with black, eleven to fourteen in number in the outer series; tarsi of all the legs marked with fuscous deepening into black, the hind tarsi also with red. Extremity of male abdomen clavate, a little recurved, the supraanal plate triangular with convex sides and rectangulate tip, the lateral margins feebly elevated, the median sulcus as in the preceding species but with rather less prominent walls; furcula present only as slight swellings of the inner extremities of the mesially parted lateral halves of the last dorsal segment; cerci pale brownish compressed laminae, consisting of a gently tapering basal half, a little tumid, straight and scarcely twice as long as the basal breadth, and a bifurcate apical half, the forks at a little less than a right angle to each other, equally divergent from the basal half, the lower slight and subaculeate, hardly so long as the mesial breadth of the stem, the upper equal or subspatulate, fully half as broad and nearly as long as the stem, incurved, subsulcate and apically rounded; subgenital plate pale yellowish brown, broad, about as broad as long, the apical margin broadly rounded, entire, sometimes subangulate laterally, a little thickened but not raised above the lateral margin

or but in the feeblest degree. Ovipositor pale brownish, tipped with reddish and margined with black.

The colors in the above description are taken mostly from living examples.

Length of body, male, 18 mm., female, 24 mm.; antennae, male and female, 9 mm.; tegmina, male, 13.5 mm., female, 17 mm.; hind femora, male, 11.5 mm., female, 13 mm.

Ninety-two males, 74 females. Moosehead Lake, Maine; Norway, Oxford County, Maine, S. I. Smith (Museum Comparative Zoology); Mount Kearsarge, New Hampshire, 2,000 feet (A. P. Morse); Pinkham Notch, New Hampshire, September (A. P. Morse); Sudbury, Rutland County, Vermont; Adams, Berkshire County, Massachusetts, August 16, 17 (A. P. Morse); Springfield, Hampden County, Massachusetts, Allen (Museum Comparative Zoology); Warwick, Franklin County, Massachusetts, Miss A. M. Edmands (same); Amherst, Hampshire County, Massachusetts (Museum Comparative Zoology); Andover, Essex County, Massachusetts; Malden and Waltham, Middlesex County, Massachusetts, September 9 (S. Henshaw); Blue Hill, Norfolk County, Massachusetts, August 14, 19 (same); vicinity of Boston and Jamaica Plain, Suffolk County, Massachusetts, August 13, 16 (S. Henshaw; S. H. Scudder); Barnstable, Massachusetts; Provincetown, Barnstable County, September (S. H. Scudder; Museum Comparative Zoology); Nantucket, Massachusetts, September (S. Henshaw; S. H. Scudder); North Haven, New Haven County, Connecticut, August 23 (A. P. Morse); Canaan, Litchfield County, Connecticut, August 18 (same); Colona, Henry County, Illinois, August, J. McNeill; Vigo County, Indiana, W. S. Blatchley; Petroleum, Ritchie County, West Virginia (Museum Comparative Zoology).

It has also been reported from Staten Island, New York (Davis), New Jersey (Smith), the borders of Lake Michigan, in Indiana (Blatchley), and Nebraska (Bruner), the last, I think, by mistake.

This species is very closely allied to *M. luridus*, but differs in its lack of any projecting part to the furcula, the less divergent forks of the cerci, less elevated, apical margin of the subgenital plate and greater maculation of the tegmina.

I first observed this species in Sudbury, Vermont, in August, 1868, abundant in the vicinity of groves in dry upland pastures; comparatively few *M. femur-rubrum* occurred with them, the latter being found in open sunny spots, and especially in hollows in the lowlands. McNeill, who was the first to find it in the West, says that in Illinois "it is restricted to the tops of hills and the sides of ravines which are too barren for pasturage." At Provincetown, Massachusetts, I found it at the sandy edges of neglected cranberry beds. According to Blatchley, this species may be found in pairing time "among the leaves and branches of the iron-weed." I found one specimen devouring a perfectly dry and dead hickory leaf. At the middle of August, in Vermont, the eggs are quite undeveloped, the ovaries lying as mere films on the

intestines of those dissected. The first pair taken in coitu was found August 16, though in Indiana many pairs were found by Blatchley by the first of August.

26. ROBUSTUS SERIES.

In this group the male prozona is quadrate or a little longitudinal and the interspace between the mesosternal lobes of the same sex twice or more than twice as long as broad. The eyes are rather widely separated and the frontal costa broad and equal. The prosternal spine is usually long. The tegmina are fully developed or only a little abbreviated and either feebly spotted, longitudinally streaked or wholly free from markings; the hind tibiae are yellow or red, with from ten to twelve spines in the outer series.

The supraanal plate is shield-shaped or triangular with feebly convex or sinuous sides, and with the surface tolerably flat; the furcula is entirely wanting or in one or two instances barely indicated; the cerci are excessively broad and stout, apically greatly expanded and flabellate, with the apical border either convex or more or less emarginate; the subgenital plate is longer than broad, generally moderately narrow, a little elevated apically and sometimes considerably prolonged, always entire.

It comprises insects of the largest size only and of a stout and bulky aspect. Five species are known, occurring in the southern half or more of the United States.

120. MELANOPLUS DIFFERENTIALIS.

(Plate XXIII, figs. 3, 4.)

Caloptenus differentialis UHLER!, MS. (1863).—WALSH, RILEY, Amer. Ent., I (1868), p. 16; *ibid.*, I (1869), p. 187.—THOMAS, Proc. Acad. Nat. Sc. Philad., 1871 (1871), p. 149.—GLOVER, Ill. N. A. Ent., Orth. (1872), pl. VIII, fig. 12, pl. IX, fig. 4, pl. XI, fig. 6.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 166, pl., fig. 5; Key Ill. Orth. (1874-75), p. 3.—RILEY!, Ann. Rep. Ins. Mo., VII (1875), pp. 124, 173, fig. 33; *ibid.*, VIII (1876), pp. 153, 154.—PUTNAM, Proc. Dav. Acad. Sc., I (1876), p. 266.—THOMAS, Bull. Ill. Mus. Nat. Hist., I (1876), p. 68.—WHITMAN, Grasshopper (1876), p. 19, fig.—BRUNER, Can. Ent., IX (1877), p. 144.—BESSEY, Bienn. Rep. Iowa Agric. Coll., VII (1877), p. 209.—THOMAS, Rep. Ent. Ill., VI (1877), pp. 44-45.—RILEY, Loc. Plague (1877), pp. 89, 194, 198-201, fig. 34; Amer. Nat., XII (1878), p. 284; Rep. U. S. Ent. Comm., I (1878), pp. 220, 223, 225-226, 228, 298-299, 301, 327, 447, 459, figs. 32, 110, pl. IV, fig. 1.—THOMAS, *ibid.*, I (1878), p. 42; Bull. U. S. Geol. Surv. Terr., IV (1878), p. 500.—RILEY, Bull. U. S. Ent. Comm., III (1880), p. 39; Amer. Ent., III (1880), p. 220.—THOMAS, Rep. Ent. Ill., IX (1880), pp. 91, 96, 127-128, fig. 24; Rep. U. S. Ent. Comm., II (1881), pp. 106-107.—LINTNER, Ins. Clover (1881), p. 5.—OSBORN, Amer. Nat., XVII (1883), pp. 1286-1287.—BRUNER, Rep. U. S. Ent. Comm., III (1883), pp. 54, 60.—FORBES, Rep. Ins. Ill., XIV (1884), p. 23.—RILEY, Stand. Nat. Hist., II (1884), pp. 194-195, fig. 271.—OSBORN, Bull. Iowa Agric. Coll. Dep. Ent., II (1884), p. 83.—BRUNER, Rep. U. S. Ent., 1884 (1885), p. 399.—RILEY, Amer. Nat., XX (1886), pp. 558-559.—COOK, Beal's Grasses N. A., I (1887), p. 373.—WEED, Bull. Ohio Agric. Exp. St., Techn. Ser., I (1889), pp. 40-41.—LUGGER, Rep. Agric. Exp. St. Minn. (1889), p. 340, fig. 16.—

- OSBORN, *Ins. Life*, IV (1891), pp. 50, 51, 55; *Rep. Ent. Soc. Ont.*, XXII (1891), pp. 70-73.—OSBORN, Goss, *Bull. Iowa Exp. St.*, XIV (1891), p. 175; *ibid.*, XV (1891), p. 267.—RILEY, *Ins. Life*, IV (1891), p. 145; *Bull. Div. Ent. U. S. Dep. Agric.*, XXV (1891), pp. 30-31, fig. 8.—OSBORN, *ibid.*, XXVII (1892), pp. 59-60.—RILEY, *Ins. Life*, IV (1892), pp. 323, 393, 401.
- Acridium differentiale* THOMAS, *Trans. Ill. St. Agric. Soc.*, V (1865), p. 450.
- Cyrtacanthacris differentialis* WALKER, *Cat. Derm. Brit. Mus.*, IV (1870), p. 610.—THOMAS, *Proc. Acad. Nat. Sc. Philad.*, 1871 (1871), p. 149.
- Pezotettix differentialis* STAL, *Bih. k. Sv. Vet.-Akad. Handl.*, V (1878), No. 9, p. 14.—WEED, *Misc. Ess. Econ. Ent. Ill.* (1886), p. 48.—HUNT, *ibid.* (1886), pp. 122-123, 126.—WEED, *Rep. Ent. Ill.*, XV (1889), p. 40.—GARMAN, *Orth. Ky.* (1894), pp. 4, 8.
- Melanoplus differentialis* BRUNER, *Bull. Washb. Coll.*, I (1885), p. 139; *ibid.*, I (1886), p. 200.—RILEY, *Rep. U. S. Ent.*, 1885 (1886), p. 233.—COQUILLET, *ibid.*, 1885 (1886), pp. 295, 297.—BRUNER, *Bull. Div. Ent. U. S. Dep. Agric.*, XIII (1887), p. 33; *Rep. Ent. Nebr. Bd. Agric.*, 1888 (1888), p. 88, fig. 4.—COMSTOCK, *Intr. Ent.* (1888), pp. 108, 111, fig. 100.—SMITH, *Bull. N. J. Exp. St.*, K (1890), p. 41.—BRUNER, *Bull. Div. Ent. U. S. Dep. Agric.*, XXII (1890), p. 104.—BLATCHLEY, *Can. Ent.*, XXIII (1891), p. 99.—BRUNER, *ibid.*, XXIII (1891), p. 193; *Ins. Life*, III (1891), p. 229.—WEBSTER, *ibid.*, III (1891), p. 300.—BRUNER, *ibid.*, IV (1891), p. 22; *Rep. Ent. Soc. Ont.*, XXII (1891), p. 48; *Bull. Div. Ent. U. S. Dep. Agric.*, XXIII (1891), p. 14.—OSBORN, *ibid.*, XXIII (1891), p. 59.—BRUNER, *Rep. St. Bd. Agric. Nebr.*, 1891 (1891), pp. 243, 307, fig. 84.—MCNEILL, *Psyche*, VI (1891), p. 74.—SMITH, *Bull. N. J. Exp. St.*, XC (1892), pp. 4, 31, pl. I.—RILEY, *Ins. Life*, IV (1892), p. 393.—KELLOGG, *ibid.*, V (1892), p. 116.—WEED, *Can. Ent.*, XXIV (1892), p. 278.—OSBORN, *Proc. Iowa Acad. Sc.*, I, Pt. II (1892), p. 118.—KELLOGG, *Inj. Ins. Kans.* (1892), p. 42, figs. 22, 23a.—BRUNER, *Bull. Div. Ent. U. S. Dep. Agric.*, XXVII (1892), pp. 32-33; *ibid.*, XXVIII (1893), pp. 15-17, fig. 5; *ibid.*, XXX (1893), p. 35.—OSBORN, *ibid.*, XXX (1893), p. 47.—BRUNER, *Publ. Nebr. Acad. Sc.*, III (1893), p. 27; *Rep. Nebr. St. Bd. Agric.*, 1893 (1893), p. 461, fig. 103.—OSBORN, *Ins. Life*, V (1893), pp. 323-324; *Papers Iowa Ins.* (1893), p. 58.—BRUNER, *Ins. Life*, VI (1893), p. 31.—OSBORN, *ibid.*, VI (1893), pp. 80-81.—BRUNER, *Rep. St. Hort. Soc. Nebr.*, 1894 (1894), pp. 163, 204, fig. 67; *Bull. Div. Ent. U. S. Dep. Agric.*, XXXII (1894), p. 12; *Nebr. St. Hort. Rep.*, 1895 (1895), p. 69.

The largest of our species of *Melanopli* and heavy bodied; excepting the hind legs and the lateral lobes of the pronotum, the general color is a nearly uniform brownish testaceous, becoming paler testaceous in specimens from arid regions; in those from Nebraska, Kansas, and Colorado it is sometimes a blackish green, while in those from Illinois and Indiana it is often of a dark brownish green. The head has sometimes a pair of dusky, divergent stripes, passing from the posterior corners of the fastigium backward across the vertex and, when these are present, there are often other but irregular streaks of similar tint on the genae and clouds over parts of the face; the vertex is gently arched, more gently in the female than in the male, with a broad interval between the eyes, the fastigium broadly and not very deeply impressed; frontal costa broad but narrower than the interspace between the eyes, percurrent, equal except for a slight expansion below. broadly and shallowly sulcate below (and including) the ocellus, punctate; eyes moderately prominent, short, not a great deal longer than broad; antennae fulvo-testaceous, nearly twice as long (male) or fully

half as long again (female) as the pronotum. Pronotum subequal, the metazona expanding somewhat, the disk of the prozona sometimes (but not always) very feebly tumid, the front margin feebly convex, the hind margin obtusely and roundly angulate, more obtusely in specimens from the Pacific Coast than in others, the median carina distinct and sharp on the metazona, less prominent but distinct on the anterior half of the prozona, still less distinct (occasionally subobsolete) between the sulci; prozona subquadrate in both sexes, smooth, divided in the middle, and barely before the middle of the posterior half, by sulci, the principal sulcus bent forward in the middle by the posterior emargination of the prozona, the metazona plane, finely subruguloso-punctate; lateral lobes nearly vertical, separated from the disk by a well-rounded angle nowhere forming distinct lateral carinae, marked next the upper limit on the prozona by broken blackish patches, frequently reduced to a pair of short, oblique, black dashes, one in either longitudinal half of the prozona, each in a clearer field, and also by the blackening of the sulci in this region; they are sometimes accompanied by slender, oblique, parallel, black lines lower down, the hinder the lower; the pleural incisures are also heavily marked in black. Prosternal spine rather long, conical as seen from the side, bluntly cylindrical as seen from in front, a very little retrorse. Tegmina at least reaching (female) or distinctly surpassing (male) the hind femora, absolutely free from maculation, the narrowest apical portion about half as broad as the broadest subbasal portion; wings pellucid or (in darkest forms) very feebly infumated, feebly and narrowly opaque along the costal margin, the veins and cross veins mostly brownish fuscous. Fore and middle femora of male heavily bullate, the hind femora stout and rather short, moderately tumid, generally fulvo-testaceous, sometimes flavo-testaceous beneath, the outer face with alternate, fulvo-testaceous and black, narrow, equal fish-bone markings, the black rarely interrupted in the middle,¹ the upper inner face with small basal and large median and postmedian black patches, the genicular arc black on both inner and outer sides; hind tibiae yellow or fulvous (occasionally in California bright coral red), with a postbasal narrow black annulus (in dark specimens more or less infuscated beyond it), the spines black to their very base, ten to eleven, rarely twelve, in number in the outer series. Extremity of male abdomen heavily clavate, the supraanal plate subclypeate, obtusely angulate at apex, the margins feebly and broadly elevated and the median portion correspondingly elevated and bearing on its summit a moderately shallow, longitudinal sulcus, tolerably broad and subequal on the basal half, narrowing and with falling walls apically; furcula completely absent or indicated only by a thickening of the last dorsal segment at their proper position; cerci very large

¹ In the dark forms the black markings sometimes run together and cover the whole face, partially interrupted near the middle and in the middle of the basal half, with fulvous.

and coarse, laminate, boot-shaped, the basal half subequal, punctate and straight, beyond expanding and at the same time feebly bifurcate, the upper fork as long and more than half as broad as the base, feebly incurved, strongly upcurved, apically tapering slightly and well rounded, the lower fork at right angles to it, forming only a rounded, downward and posteriorly projecting lobe, so that the apical margin of the whole is deeply and roundly emarginate below, the whole surpassing a little the supraanal plate; infracercal plates wholly obscured; subgenital plate short and broad, scarcely so broad apically as long, the apical margin thickened, but hardly otherwise either elevated or prolonged, entire; upper valve of ovipositor abruptly upturned apically and sharply acuminate, the upper outer carina feebly serrate.

Length of body, male, 39 mm., female, 41 mm.; antennae, male, 18 mm., female, 16 mm.; tegmina, male, 32 mm., female, 34.5 mm.; hind femora, male, 20 mm., female, 23 mm. Some specimens, especially from the North (Illinois, e. g.), are hardly more than half this size.

Seventy-two males, 90 females. Cheyenne, Laramie County, Wyoming, August 21, Osten Sacken; Lincoln, Lancaster County, Nebraska, August 8 (U.S.N.M.—Riley collection); Brownville, Nemaha County, Nebraska, August, R. N. Furnas (same); Fort McPherson, Nebraska (Museum Comparative Zoology); Denison, Crawford County, Iowa, July 15, J. A. Allen; Jefferson, Greene County, Iowa, July 20–24, Allen; Dallas County, Iowa, August 20–23, September, Allen; Vigo County, Indiana, Blatchley (A. P. Morse); Lafayette, Tippecanoe County, Indiana, November 26, C. R. Barnes (U.S.N.M.—Riley collection); Illinois, Uhler, J. H. Treat (Museum Comparative Zoology); northern Illinois, Strumberg (S. Henshaw); Moline, Rock Island County, Illinois, McNeill; Peoria, Illinois, W. Barnes (Museum Comparative Zoology); southern Illinois, Kennicott, Thomas; Missouri, *in coitu* September 4 (U.S.N.M.—Riley collection); St. Louis, Missouri, Geo. Engelmann; the same, August 18, and central Missouri, July (U.S.N.M.—Riley collection); Garden City, Finney County, Kansas, July 26 (same); Lakin, Kearny County, Kansas, July 27 (same; S. H. Scudder); Fort Ellis, Kansas, Watson (Museum Comparative Zoology); between Smoky Hill, Kansas, and Denver, Colorado, L. Agassiz (same); Colorado (U.S.N.M.—Riley collection); Pueblo, Colorado, 4,700 feet, August 30–31; Sabinal, Socorro County, New Mexico, August 7, Townsend; Socorro, New Mexico, G. May (U.S.N.M.—Riley collection); Agricultural College, Mississippi, Weed; Texas, Belfrage, L. H. H. H. H.; Dallas, Texas, Boll (U.S.N.M.—Riley collection; S. H. Scudder); Columbus, Colorado County, Texas (U.S.N.M.—Riley collection); Gulf coast of Texas, Aaron; Pecos River, Texas, June 20, Captain Pope; Los Angeles, California, Coquillett (U.S.N.M.—Riley collection; L. Bruner); Agua Caliente, Sonoma County, California, Palmer; Mexico (Museum Comparative Zoology; U.S.N.M.—Riley collection); Queretaro, Mexico, November (L. Bruner).

It has also been reported from New Jersey in cranberry bogs

(Smith); Posey and Gibson counties, Indiana (Webster); western Kentucky (Garman); Mercer County, Illinois (Thomas); Iroquois County, Illinois (Riley); Jackson County, Illinois (Thomas); western Iowa (Bruner); Buchanan and Nodaway counties, Missouri (Osborn); Shawnee, Labette, and Barber counties, Kansas (Bruner); Hamilton County, Kansas (Bruner, Kellogg); Indian Territory (Bruner); Brown and Washington counties, Texas (Riley); Grand Junction, Mesa County, Colorado (Bruner); Lincoln County, Nevada (Riley); Arizona (Bruner); and San Joaquin Valley, California (Coquillett).

It appears from this that it inhabits the Mississippi Valley from as far north as latitude 43° to the Gulf, and the region to the west as far as the Pacific, from a somewhat lower latitude to central Mexico. I do not think it occurs above 6,000 feet. One can not but question the accuracy of the statement that it occurs in New Jersey,¹ as it has never been reported elsewhere east of the Alleghanies, and if found there would also occur farther south; so large an insect and so distinct from others found there would hardly have escaped notice by entomologists of the eastern seaboard in Maryland and Virginia.

The oviposition and arrangement of eggs in the egg-capsule of this insect, as well as its parasites, are described by Riley in the first Report of the United States Entomological Commission, and with its life-history are later summarized by him, as follows:—

In the vicinity of St. Louis, Missouri, the first specimens of this locust were observed to become winged July 19. Eggs were laid September 9. As a deviation from the usual egg-laying habits of the genus . . . the eggs are sometimes very numerously placed under bark of logs that have been felled on low lands. The eggs of this species, unlike those of *spretus*, *atlantis* and *femur-rubrum*, are not quadrilinearly but irregularly arranged. . . . The head ends of the eggs in the pod point mostly outward. One hundred and seventy-five eggs have been counted in a single mass.

Mr. Coquillett has made some interesting observations [in California]. . . . They acquired wings from the last week in June to the last week in July and began laying eggs July 23. A single female occupied 75 minutes in depositing an egg-mass. The situation chosen for egg laying was invariably the edge of one of the basin-like hollows [for irrigation?] at the foot of a tree. This locust is not easily startled, and its ordinary flight is rather heavy, and sustained only for a distance of 12 to 20 feet.

According to Thomas and Riley, this insect is occasionally seen flying at considerable heights and apparently migrating, though these are rare occurrences. It certainly is occasionally one of the most destructive pests in the West, particularly in Kansas, Missouri and Illinois, and it has been noted as injuring grass, alfalfa, Indian corn, beets, orchard trees, mulberry, poplar and catalpa trees, and even grape vines; also dahlias, hollyhocks and other garden flowers have been specified as its food, not to mention the rag weed, *Ambrosia trifida*.

¹Since this was sent to the printer I have seen specimens from Camden County, New Jersey, in the collection of the American Entomological Society.

Professor Lawrence Bruner gives the following excellent summary of its destructiveness and habits:

This insect has very frequently multiplied in such numbers in limited areas over its range as to do considerable injury to cultivated crops growing upon low, moist ground; and has even been known very frequently to spread over higher and dryer lands adjoining these, its customary haunts. It is one of the few species of locusts that has thus far shown a tendency toward civilization. This it has done readily, since its habits are in unison with the cultivation of the soil. It is only since the settlement of the country where it originally occurred that it has multiplied so as to become sufficiently numerous to become a serious pest. . . .

The eggs . . . are laid in cultivated grounds that are more or less compact, preferably old roads, deserted fields, the edges of weed patches, and well-grazed pastures adjoining weedy ravines. Egg laying begins about the middle of August and continues into October, varying of course, according to latitude and climatic conditions. Usually but not always, only a single cluster of eggs is deposited by each female. Frequently there are two, and in extreme cases perhaps even three, of these clusters deposited by a single female.

121. MELANOPLUS ROBUSTUS.

(Plate XXIII, fig. 5.)

Caloptenus robustus SCUDDER!, Proc. Bost. Soc. Nat. Hist., XVII (1875), p. 473; Ent. Notes, IV (1875), p. 72.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 42.—SCUDDER!, Cent. Orth. (1879), p. 17.—RILEY, Am. Ent., III (1880), p. 220.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 60.

Caloptenus ponderosus SCUDDER, Proc. Bost. Soc. Nat. Hist., XVII (1875), p. 473; Ent. Notes, IV (1875), p. 72.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 42.—SCUDDER, Cent. Orth. (1879), p. 17.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 60.

Pezotettix robustus STÅL, Bih. K. Sv. Vet.-Akad. Handl., V, No. 9 (1878), p. 14.

Melanoplus robustus SCUDDER, Cent. Orth. (1879), p. 84.—BRUNER, Bull. Div. Ent. U. S. Dep. Agric., XXVII (1892), p. 33; *ibid.*, XXVIII (1893), pp. 17-19, figs. 6, 7; Rep. Nebr. St. Bd. Agric., 1893 (1893), p. 460.

Melanoplus ponderosus SCUDDER, Cent. Orth. (1879), p. 84.—BRUNER, Can. Ent., XXIII (1891), p. 193; Ins. Life, IV (1891), p. 22; Rep. Ent. Soc. Ont., XXII (1891), p. 48.

Varying from brownish testaceous to brownish fuscous, with more or less of a cinereous tint; front of head and sides of pronotum a little paler, tinged with yellow, the head obscurely and more or less heavily flecked with brown: antennae yellow, infuscated toward the tip. Interspace between the eyes much broader than (male) or twice as broad as (female) the basal antennal joint, the fastigium broad, broadening in front, scarcely depressed except sometimes slightly in the narrowest part, the lateral margins sharp; frontal costa broad, broadening below, broadly and shallowly sulcate excepting above. Pronotum broadening a little on the metazona, the median carina slight, broken by all the sulci, distinct only in front of and behind them; lateral carinae rather distinct but slight and rounded. Slight black markings follow the anterior portion of the lateral carinae and the transverse sulci of the lateral lobes; occasionally these markings are more pronounced, and then a slender blackish stripe passes from behind the eyes to the metazona, sometimes interrupted, sometimes accompanied by an infuscation

beneath, broadening the band; disk of prozona more or less flecked with dark brown, sometimes collected into a V-shaped patch opening forward, the apex at the middle of the metazona; hind margin dotted with blackish; metazona profusely, prozona sparsely, both shallowly punctate; sides of metathorax with a pale oblique stripe narrowing upward to a point. Prosternal spine moderately long, stout, subcylindrical, feebly appressed, erect, blunt-tipped. Tegmina reaching (female) or slightly surpassing (male) the tips of the hind femora, darker or lighter brownish fuscous, flecked rather distantly with brownish spots, relieved by similar pale spots along the middle, occasionally more or less confluent. Legs of the color of the under surface, the fore and middle femora a little deeper or duskier; hind femora broadly bifasciate with blackish, broken by the pale incisures, the genicular arc black on both sides; hind tibiae yellow, occasionally tinged with red, paler next the base with a black annulus, the spines black to their very base, ten to twelve, usually eleven, in number in the outer series. Extremity of male abdomen subclavate, upturned slightly, well rounded; supraanal plate broad, clypeate, with slightly produced rectangular apex, slightly sinuate sides, the lateral margins gently elevated, the middle longitudinal half very broadly tectate with a moderately broad and deep median sulcus extending over a little more than the basal half; furecula wanting or sometimes indicated by the merest angle; cerci very stout, subspatulate, compressed, largest at tip, the basal two-fifths equal and straight, the remainder expanding into an obliquely transverse, obovate, rounded lobe, its outer border convex, directed upward and more produced above than below, making the tip fully half as broad again as the base; infracercal plates visible only by their feeble, narrow, blunt-tipped projection beyond the supraanal plate; subgenital plate not very broad, the apex both produced and elevated a little.

Length of body, male, 29.5 mm., female, 34.5 mm.; antennae, male, 13.5 mm., female, 15 mm.; tegmina, male, 21 mm., female, 24 mm.; hind femora, male, 17.5 mm., female, 21 mm.

Twenty-two males, 18 females. Texas, Belfrage; Dallas, Texas, Boll (U.S.N.M.—Riley collection; S. H. Scudder); Gulf coast of Texas, Aaron.

Although the single male type of *Cal. ponderosus* has been lost, I have no doubt from the study of the larger material now at hand that it is the same as *Cal. robustus*, described at the same time and place.

122. MELANOPLUS VIOLA.

(Plate XXIV, fig. 1.)

Pezotettix viola THOMAS!, Bull. Ill. Mus. Nat. Hist., I (1876), p. 68.—RILEY, Rep. U. S. Ent. Comm., I (1878), pp. 220, 226.—SCUDDER!, Can. Ent., XII (1880), p. 75.—THOMAS!, Rep. Ent. Ill., IX (1880), pp. 90, 95, 121.—MCNEILL, Psyche, VI (1891), p. 76.—BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 27.—GARMAN, Orth. Ky. (1894), p. 8.

Caloplennus affiliatus UHLER!, MS.

Pezotettix affiliatus SCUDDER!, Can. Ent., XII (1880), p. 75.

Dark brownish fuscous, the upper half of the lateral lobes of the pronotum and especially of the prozona generally distinctly darker than the lower, often forming a broad dark band. Head brownish fuscous, lighter below, irregularly flecked and mottled with fuscous, gently tumid above; interspace between the eyes broad, but narrower than the frontal costa, the fastigium plane but with the margins feebly and roundly elevated at its narrowest, broadening in front and passing insensibly into the frontal costa; the latter very broad, subequal, not at all constricted above, shallowly sulcate at and below the ocellus, feebly punctate; eyes elongate oval, narrower above than below, but little prominent; antennae about as long (male) or hardly three-fourths as long (female) as the hind femora, rather slender, fulvo-testaceous. Pronotum scarcely enlarging posteriorly, the disk nearly plane, with rounded lateral carinae separating it from the vertical lateral lobes, the prozona barely longitudinal (male) or barely transverse (female), about a fourth (male) or less than that (female) longer than the metazona, the median carina subobsolete between the sulci and more distinct on the metazona than on the prozona, the front border barely convex, the hind border broadly convex or more frequently obtusely angulato-convex, its prominence slightly variable, the principal sulcus not quite transverse by the slight emargination of the posterior border of the prozona, ferrugineo-testaceous, profusely and finely flecked with fuscous, rather feebly punctate even on the metazona, the lateral lobes with a sometimes obsolete, generally somewhat obscure, dark fuscous band, in extreme cases extending from the eyes across the whole pronotum and occupying nearly the whole upper half of the lateral lobes; thoracic epimera black. Prosternal spine stout, rather long, cylindrical, tapering only at the rounded apex, somewhat retrorse. Tegmina always abbreviated, distinctly shorter than the abdomen or the hind femora, generally a little longer than the head and pronotum together, dark fuscous, the anal area sometimes much lighter, the discoidal area flecked somewhat confusedly with mingled blackish and light testaceous, the apex bluntly acuminate. Hind femora moderately stout and rather long, testaceous, varying from cinereous to dull flavous, broadly bifasciate with black, the genicular arc black on both sides; beneath they are normally flavous or fulvous; hind tibiae dull red, with a narrow, subbasal, black annulus, next which they are more or less obscured with fuscous, sometimes forming a dusky belt half way to the tip, the spines black almost to the very base, ten to eleven in number in the outer series. Posterior extremity of male abdomen feebly clavate, well rounded, the supraanal plate rounded triangular with a feebly produced tip, nearly flat, the median sulcus percurrent, slender, moderately deep, bounded by low rounded walls which extend over about three-fourths of the plate; fureula wanting, the last dorsal segment narrow and narrowly parted in the middle; cerci heavy, broad, punctate except apically, externally broadly convex, the basal two-fifths nearly equal, beyond expanding rapidly and con-

siderably to an obliquely transverse, broad, oval lobe with regularly rounded contour, above expanding twice as much as below, the whole feebly incurved and surpassing the supraanal plate; infracercal plates hardly visible, briefer than the supraanal plate; subgenital plate rather narrow, subequal, abruptly, roundly, and considerably elevated apically, but not produced, entire.

Length of body, male and female, 25 mm.; antennae, male, 15 mm., female, 12 mm.; tegmina, male, 13.5 mm., female, 9 mm.; hind femora, male and female, 16 mm. The female measured has exceptionally short tegmina.

Nine males, 12 females. St. Louis, Missouri (U.S.N.M.—Riley collection); central Missouri (same); Illinois, Uhler; southern Illinois, Kennicott, Thomas.

It has also been reported from central Illinois (Thomas): Running Lake, Illinois, July 15, September (McNeill); Anderson, Fulton, Hopkins and Christian counties and Elk Lick Falls, Kentucky (Garman); southeast Nebraska (Bruner). It would therefore appear to have a rather narrow range, in the central Mississippi Valley, between latitude 37°–40°, and longitude 86°–96°.

123. MELANOPLUS CLYPEATUS.

(Plate XXIV, fig. 2.)

Caloptenus clypeatus SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1877), p. 40; Ent. Notes, VI (1878), p. 18.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 60.

Melanoplus clypeatus SCUDDER!, Can. Ent., XII (1880), p. 75.

Brownish testaceous. Front of head varying from dull luteous to dull reddish brown, faintly dotted with fuscous; tips of mandibles and lower edge of labrum marked with black; interspace between the eyes a little (male) or much (female) broader than the basal antennal joint, very slightly depressed centrally, at least in the male; frontal costa broad, subequal, slightly depressed at the ocellus; antennae luteous, infuscated on the apical half, nearly (male) or about two-thirds (female) as long as the hind femora. Pronotum scarcely enlarging posteriorly, with but slight transverse sulci and a slight median carina, equal and percurrent in the female, interrupted slightly between the sulci in the male; lateral carinae indistinct, rounded; top of head and pronotum dotted faintly with fuscous, the lateral lobes of the latter paler, marked next the lateral carinae with a black streak, which narrows and disappears posteriorly, broadens anteriorly and extends slightly upon the head. Prosternal spine rather long, cylindrical or conico-cylindrical, blunt-tipped, feebly retrorse. Tegmina not reaching the tip of the abdomen, about as long as the femora, the costal field dark testaceous, the discoidal field blackish, and the anal field, which is separated angularly from the rest, light testaceous or wood-brown. Fore and middle legs of the color of the body; hind femora long and moderately stout, blackish on their outer face, but the inferior outer carina

yellow, black interrupted with luteo-testaceous on the inner face, beneath vinous red; hind tibiae varying from vinous to bright red, more or less infuscated on basal half, with a blackish fuscous subbasal annulus, the spines black to the base, eleven to twelve in number in the outer series. Extremity of male abdomen considerably thickened, forming a subglobose mass: supraanal plate shield-shaped, triangularly produced at the apex, narrowly and deeply sulcate down the middle: no furecula: cerci stout, compressed, constricted in the middle as seen from the side, beyond incurved, expanded especially above, the apical border much compressed, convex in the middle half, straight above and below, or feebly emarginate at the union of the convex and straight portions: infracercal plates completely concealed; subgenital plate moderately broad, slightly, broadly, and uniformly elevated apically, hardly prolonged.

Length of body, male, 28.5 mm., female, 36 mm.: antennae, male, 15 mm., female, 14.5 mm.; tegmina, male, 17 mm., female, 18.5 mm.; hind femora, male, 17 mm., female, 21 mm.

Two males, 1 female. Georgia, Morrison.

124. *MELANOPLUS FURCATUS*, new species.

(Plate XXIV, fig. 3.)

Brownish-ferruginous, the top of head and prozona very faintly dotted with fuscous. Head gently tumid above, the interspace between the eyes broad, but distinctly narrower than the frontal costa, the fastigium most feebly depressed, running without break into the frontal costa, which is broad, equal, shallowly sulcate at and below the ocellus, punctate on either side: eyes pretty large, rather elongate, not very prominent: antennae fulvous, becoming a little infuscated apically, almost as long as the hind femora in both sexes, being relatively almost as long in the female as in the male. Pronotum enlarging slightly posteriorly, at least in the female, the disk very flatly tectate, the median carina very slight and subequal throughout, the lateral carinae merely forming blunt angles separating the disk from the lateral lobes, the front margin scarcely convex, the hind margin broadly and roundly angulate; disk of prozona feebly longitudinal, sparsely feebly and shallowly punctate laterally, about a fourth longer than the finely and closely punctate metazona, minutely emarginate in the middle posteriorly; lateral lobes marked precisely as in *M. clypeatus*. Prosternal spine rather long, slightly retrorse, cylindrical, but a little enlarged on the apical half. Tegmina not much shorter than the abdomen, but not nearly reaching the tip of the hind femora, testaceo-cinereus in the anal field, the rest fuscous, with dark fuscous flecks (male) or blotches (female) in the discoidal area; wings impure hyaline, with very pale brown veins and cross veins, becoming more and more fuscous in the upper half, especially toward the apex. Fore and middle femora only a little tumid in the male, uniform in color; hind femora long and rather stout and tumid.

the inner face twice barred with black, which sometimes shows feebly above, and appears again on the outer face, but diffused. subconfluent, and crossed by the pallid angulate incisures; inferior face red; genicular are black on both sides; hind tibiae red, with a subbasal, narrow, fuscous annulus, the spines black to their base, twelve in number in the outer series. Extremity of the male abdomen roundly clavate and upturned, the supraanal plate triangular and tolerably flat, but with a deep basal median sulcus reaching more than half way to the tip with pretty high and sharp bounding ridges, fading apically; furcula wholly wanting; cerci stout, heavy, and incurved, narrowing considerably toward the middle, then very rapidly expanding and furcate, the upper lobe longer than the lower and more equal, well rounded apically, directed sharply upward, the lower triangular, bluntly pointed, and turned but little downward, the apical margin of the whole deeply and angularly excised, scarcely surpassing the supraanal plate; infracercal plates just longer than the supraanal plate; subgenital plate moderately narrow, the apex acute and angularly elevated, scarcely prolonged, entire.

Length of body, male, 31.5 mm., female, 39 mm.; antennae, male, 16 mm., female, 17.5 mm.; tegmina, male, 19.5 mm., female, 23 mm.; hind femora, male, 18.5 mm., female, 22.5 mm.

One male, 1 female. Jacksonville, Duval County, Florida, Pridday, (L. Bruner).

27. BIVITTATUS SERIES.

This group is nearly related to the robustus series; the male prozona is more or less distinctly longitudinal, and the interspace between the mesosternal lobes of the same sex nearly or more than twice as long as broad; the eyes are rather widely separated, and the frontal costa broad and equal. The prosternal spine is rather long and generally slightly retrorse. The tegmina are fully developed, at least as long as the hind femora, without spots or, rarely, very feebly marmorate, but sometimes with a light stripe dividing the dorsal and lateral faces and extending across the pronotum. The hind femora are longitudinally striped on the outer face or a marked, the hind tibiae usually red, rarely purplish, with ten to thirteen spines in the outer series.

The supraanal plate is much as in the robustus series; the furcula is present as small but coarse lobes, and the cerci are much as in the robustus series, but less extravagantly developed; the subgenital plate is longer than broad, generally moderately narrow, somewhat elevated and sometimes thickened apically, hardly prolonged, and always entire.

It comprises insects of a large or a very large size, with heavy bodies and poor in flight. Five species are known, and among them they cover our entire territory, from Atlantic to Pacific and from Central Mexico to the Saskatchewan and Hudson Bay. It comprises two of our commonest species.

125. MELANOPLUS FEMORATUS.

(Plate XXIV. fig. 4.)

- Caloptenus femoratus* BURMEISTER, Handb. Ent., II (1838), p. 638.—BRUNNER, Verhandl. Zool.-Bot. Gesellsch. Wien, 1861 (1861), p. 14; Orth. Stud. (1861), p. 4.—WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 678.—PROVANCHER, Faune Ent. Can., II (1877), p. 35.
- Acridium milberti* SERVILLE!, Orth. (1839), p. 649.
- Acridium flavorittatum* HARRIS, Treat. Ins. Inj. Veg. (1841-42), p. 140; *ibid.*, 2d ed. (1852), p. 151; *ibid.*, 3d ed. (1862), p. 150.—FITCH, Amer. Journ. Agric. Sc., VI (1847), p. 146.—EMMONS, Agric. N. Y., V (1854), p. 147.—RATHVON, Rep. U. S. Dep. Agric., 1862 (1862), p. 384.
- Locusta flavorittata* PACKARD, Rep. Nat. Hist. Me. (1861), p. 375.
- Acridium (Caloptenus) femoratum* DE HAAN, Bijdr. Kenn. Orth. (1842), p. 144.
- Acridium hudsonium* BARNSTON!, MS. (Brit. Mus.).
- Caloptenus bivittatus* UHLER (pars) SAY, Ent. N. A., ed. LeC., II (1859), p. 238.—SCUDDER! (pars), Can. Nat., VII (1862), p. 287; (pars), Bost. Journ. Nat. Hist., VII (1862), p. 465.—SMITH, Proc. Portl. Soc. Nat. Hist., I (1868), p. 150.—WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 678; Can. Ent., IV (1872), p. 30.—SMITH, Rep. Conn. Bd. Agric., 1872 (1872), pp. 362, 381, fig. 7.—GLOVER, Ill. N. A. Ent., Orth. (1872), pl. v, fig. 16.—THOMAS (pars), Rep. U. S. Geol. Surv. Terr., V (1873), p. 166.—PROVANCHER, Nat. Can., VIII (1876), p. 109.—HOWARD, Ins. Life, VII (1895), p. 274.
- Pezzettia edax* SAUSSURE!, Rev. Mag. Zool., 1861 (1861), p. 161; Orth. Nov. Am., II (1861), p. 11.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 152.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59.—SMITH, Cat. Ins. N. J. (1890), p. 412.
- Acridium (Caloptenus) bivittatum* UHLER (pars), Hart. Treat. Ins. Inj. Veg. (1862), p. 174.
- Podisma edax* WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 718.
- Melanoplus bivittatus* (pars), Hitchc. Rep. Geol. N. H., I (1874), p. 376.—SMITH, Bull. N. J. Exp. St., K (1890), p. 41; Cat. Ins. N. J. (1890), p. 413.—BLATCHLEY (pars), Can. Ent., XXIII (1891), pp. 99-100.—BRUNER (pars), Can. Ent., XXIII (1891), p. 193; (pars), Ins. Life, IV (1891), pp. 21-22, 146; (pars), Rep. Ent. Soc. Ont., XXII (1891), p. 48; (pars), Bull. Div. Ent. U. S. Dep. Agric., XXVIII (1893), pp. 19-21, fig. 8.—MORSE (pars), Psyche, VII (1894), p. 106.—BEUTENMÜLLER, Bull. Amer. Mus. Nat. Hist., VI (1894), p. 308, pl. VIII, fig. 8.
- Melanoplus femoratus* SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1878), pp. 285, 288; Ent. Notes, VI (1878), pp. 44, 47; Rep. U. S. Ent. Comm., II (1881), App., p. 24.—BRUNER, *ibid.*, III (1883), p. 60; Can. Ent., XVII (1885), p. 18.—CAULFIELD, Rep. Ent. Soc. Ont., XVIII (1886), p. 71; Can. Ent., XVIII (1886), p. 212.—COMSTOCK, Intr. Ent. (1888), pp. 108, 110, fig. 99.—FERNALD, Orth. N. E. (1888), pp. 31, 32, fig. 13; Ann. Rep. Mass. Agric. Coll., XXV (1888), pp. 115, 116, fig. 13.—DAVIS, Ent. Amer., V (1889), p. 81.—BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 27.
- Caloptenus (Melanoplus) femoratus* CAULFIELD, Can. Rec. Sc., II (1887), p. 401; Can. Orth. (1887), p. 14.
- Melanoplus bivittatus femoratus* MORSE, Psyche, VII (1894), p. 106.

Very variable in brightness of color, but generally dark brownish fuscous, marked, generally heavily, with flavous stripes, flavo-fulvous beneath, the female at least often tinged throughout with olivaceous. Head flavous, more or less blotched or suffused with fuscous, blackish

fuscous above except in widening flavous stripes which follow the outer margins of the fastigium and cross the head to the lateral carinae of the pronotum; vertex gently tumid, the interspace between the eyes broad, almost or quite as broad as the frontal costa, the fastigium plane or rarely, in the male, very feebly briefly and broadly sulcate, passing insensibly into the frontal costa; the latter broad, subequal but feebly and broadly narrowed above, plane or feebly sulcate below, percurrent; eyes moderately prominent in the male, moderately large, not very elongate even in the female, scarcely longer than the infraocular portion of the genae; antennae fulvous, becoming fuscous apically, as long (male) or hardly more than two-thirds as long (female) as the hind femora. Pronotum subequal, but barely expanding on the metazona (male) or distinctly though not greatly expanding from the posterior sulcus of the prozona (female), the disk nearly plane but slightly convex, separated from the subvertical lateral lobes by a tolerably pronounced but rounded angle, the median carina feeble, between the sulci feebler, rarely subobsolete; prozona very feebly and very sparsely punctate, slightly (male) or feebly (female) longitudinal, fully a half (male) or from a fourth to a third (female) longer than the closely and delicately punctate metazona; front margin truncate or barely convex, hind margin broadly rotundato-angulate; disk dark brownish fuscous, more or less dark olivaceous in life, the lateral carinae more or less heavily marked with a flavous stripe upon the disk, next to which the lateral lobes are darkest, gradually fading below, but often forming a blackish lateral stripe, which extends from the hinder edge of the eyes across the prozona and dies out upon the metazona; at their lowest margin the lateral lobes are of nearly the same color as the under surface, and occasionally the whole of the lateral lobes are uniformly dull flavous or flavo-testaceous, the flavous stripe of the lateral carinae marked only by its brightness and a feeble blackish external edging. Prosternal spine rather long and a little retrorse, conical as seen laterally, cylindrical or conico-cylindrical from in front. Tegmina reaching or a little surpassing the hind femora, rarely a little less in the female, tapering very regularly and gradually from the subbasal expansion, strongly and uniformly rounded at tip, with a flavous stripe along the anal vein, elsewhere fuscous, deepest in color in the discoidal area, free from mottling; wings hyaline with the feeblest flavous tinge, the veins and cross veins pallid green but becoming more and more fuscous toward the apex. Fore and middle femora fulvo-olivaceous, a little infuscated above and apically; hind femora rather long and only moderately stout, very variable in ground color but usually lighter than the general color of the body, sometimes much lighter, sometimes without stripes or bands except an infuscation along the upper carina of the outer face, at others infuscated over most of the upper half of that face, rarely with three distinct, broad, black patches along the inner half of the upper face, basal, median, and postmedian, the genicular are always black or

blackish fuscous on both sides; hind tibiae paler or brighter coral red, sometimes with a subbasal, narrow, black, imperfect annulus, occasionally followed but not immediately by a slight and brief infuscation, the spines black, at extreme base pale or reddish, ten to thirteen in number in the outer series. Extremity of male abdomen feebly clavate, well rounded, upturned, the supraanal plate subelypate, nearly flat, with a narrow and very deep median sulcus, fading just before the tip, bounded by high sharp walls, between which and the lateral margins is a broad and shallow trough; furecula consisting of a pair of slight triangular lobes broader than long, separated by their own breadth; cerci very stout, large and broad, laminate, externally convex, the basal half narrowing gently, beyond the middle at once expanding into two lobes: an upper, nearly as long as the basal half of the cerci, directed upward and backward, forming an ovate pad; and a lower, brief, triangular denticle, broader than long, the apical margin more or less distinctly emarginate below between them; infracercal plates shorter than the supraanal plate, but expanding a little laterally beyond its margins; subgenital plate moderately narrow and subequal, at apex a little elevated and prolonged, with a subdued tubercle.

Length of body, male, 26.5 mm., female, 41 mm.; antennae, male, 18 mm., female, 14 mm.; tegmina, male, 21 mm., female, 23.5 mm.; hind femora, male, 17.25 mm., female, 21 mm.

Ninety males, 124 females. Halifax, Nova Scotia, H. Piers; Maine (U.S.N.M.—Riley collection); Moosehead Lake, Maine; Norway, Oxford County, Maine. S. I. Smith (Museum Comparative Zoology); Brunswick, Cumberland County, Maine, Packard (same); Montreal, Canada; New Hampshire (U.S.N.M.—Riley collection); White Mountains, New Hampshire, Shurtleff, Packard (Museum Comparative Zoology; S. Henshaw); Mount Washington, subalpine, and valleys of White Mountains, New Hampshire; Mount Washington, alpine (A. P. Morse); summit Mount Kearsarge, New Hampshire, 3,251 feet (A. P. Morse); Bethlehem, Grafton County, New Hampshire, L. Agassiz (Museum Comparative Zoology); Sudbury, Rutland County, Vermont; Burlington and Hinesburg, Chittenden County, Vermont, J. B. Perry (Museum Comparative Zoology); Warwick, Franklin County, Massachusetts, Miss Edmands (same); Salem, Essex County, Massachusetts, Putnam, Kingsley (same); vicinity of Boston, Massachusetts; Nantucket Island, Massachusetts; Williamstown, Berkshire County, Massachusetts; Connecticut; New York, Akhurst; Sullivan County, New York, Shaler (Museum Comparative Zoology); Chateaugay Lake, Adirondacks, New York, F. C. Bowditch; Long Island, New York; Pottsville, Schuylkill County, Pennsylvania, Shaler (Museum Comparative Zoology); Maryland, Uhler (same); Patterson Creek, West Virginia, Shaler (same); Upper Tract, Pendleton County, West Virginia, Shaler (same); Williamsport, Virginia, Shaler (same); Shenandoah Valley, Virginia, Packard (same); North Carolina, Morrison; Indiana (U.S.N.M.;

W. S. Blatchley): Michigan, M. Miles; Bear Lake, Michigan (U.S. N.M.—Riley collection); Lake Winnipeg, Manitoba; Illinois, Uhler, Stromberg (S. Henshaw: S. H. Scudder); Moline, Rock Island County, Illinois, McNeill; Denison, Crawford County, Iowa, J. A. Allen; Missouri, (U.S.N.M.—Riley collection); Fort Robinson, Dawes County, Nebraska, Bruner (same); Colorado, 5,500 feet, Morrison; Cheyenne, Laramie County, Wyoming, Osten Sacken; Evanston, Uinta County, Wyoming, 6,800 feet, August 6; Steele, Wyoming (U.S.N.M.—Riley collection); Calgary, Alberta, June 15 (S. Henshaw); British Columbia (same); Vancouver Island, British Columbia, H. Edwards; Vancouver Island, British Columbia, Crotch (Museum Comparative Zoology); Washington, Morrison (S. Henshaw); Mount Shasta district, California, H. Edwards; Sissons, Siskiyou County, California (Museum Comparative Zoology); Los Angeles, California, Coquillett (U.S.N.M.—Riley collection).

It has also been reported from Hudson Bay (Walker); Quebec, Canada (Provancher), and Carolina (Burmeister, Saussure). Its range in the eastern part of the country is therefore from Hudson Bay to North Carolina, on the Pacific Coast from Vancouver to southern California, while in the interior, south of Canada, it occurs in less abundance as far south as latitude 40° or thereabouts.

An examination of three females in Vermont in the middle of August showed thirty-nine eggs in the ovaries on one side and thirty on the other of the first; forty-five on one side and forty-two on the other of the second; and thirty-eight on each side of the third, the total number of eggs varying from sixty-nine to eighty-seven. A fourth female had no eggs in the ovaries, but the abdomen was filled with a filarian worm at least two feet long; the eggs are pale yellow.

This insect is very fond of perching by the roadside on the broad leaves of *Inula helenium*, sunning itself.

126. MELANOPLUS BIVITTATUS.

(Plate XXIV, fig. 5.)

Gryllus bivittatus SAY, Journ. Acad. Nat. Sc. Philad., IV (1825), p. 308; Ent. N. A., ed. LeC., II (1859), p. 237.

Acridium (Opsomala) bivittatum DE HAAN, Bijdr. Kenn. Orth. (1842), p. 144.

Caloptenus bivittatus UHLER (pars) Say, Ent. N. A., ed. LeC., II (1859), p. 238.—SCUDDER! (pars), Can. Nat., VII (1862), p. 287; (pars), Bost. Journ. Nat. Hist., VII (1862), p. 465.—WALSH, RILEY, Amer. Ent., I (1868), p. 16.—PACKARD, Guide Ins. (1869), p. 570.—THOMAS, Proc. Acad. Nat. Sc. Philad., 1870 (1870), p. 78; Ann. Rep. U. S. Geol. Surv. Terr., II (1871), p. 265.—DODGE, Can. Ent., IV (1872), p. 15.—SCUDDER, Rep. U. S. Geol. Surv. Nebr. (1872), pp. 250, 259.—GLÖVER, Ill. N. A. Ent., Orth. (1872), pl. 1, fig. 16.—THOMAS (pars), Rep. U. S. Geol. Surv. Terr., V (1873), p. 166; Key Ill. Orth. (1874-75), p. 3.—SCUDDER!, Daws. Rep. Geol. Rec. 49th Pat. (1875), p. 343.—RILEY, Ann. Rep. Ins. Mo., VII (1875), pp. 124, 173, fig. 34.—THOMAS, Proc. Dav. Acad. Nat. Sc., I (1876), p. 261.—SCUDDER!, Bull. U. S. Geol. Surv. Terr., II (1876), p. 261.—WHITMAN, Grasshopper (1876), p. 19, fig.—UHLER, Bull. U. S. Geol.

- Surv. Terr., III (1877), p. 796.—BESSEY, Bienn. Rep. Iowa Agric. Coll., VII (1877), p. 209.—THOMAS, Rep. Geol. Expl. Surv. W. 100th Mer., V (1875 [1877]), p. 894.—BRUNER, Can. Ent., IX (1877), p. 144.—RILEY, Loc. Plague (1877), pp. 89, 194-195, fig. 38.—THOMAS, Bull. U. S. Geol. Surv. Terr., IV (1878), p. 484; Ann. Rep. Chief Eng., 1878 (1878), 1845; Rep. U. S. Ent. Comm., I (1878), p. 42.—RILEY, *ibid.*, I (1878), pp. 220, 221, 226, 327, 459, fig. 111.—PACKARD, *ibid.*, I (1878) pp. [140, 142].—GIRARD, *Traité élém. d'ent.*, II (1879), p. 248.—RILEY, Amer. Ent., III (1880), p. 220.—THOMAS, Rep. Ent. Ill., IX (1880), pp. 91, 96, 126-127.—LINTNER, *Ins. Clover* (1882), p. 5.—BRUNER, Bull. Div. Ent. U. S. Dep. Agric., II (1883), p. 9; Rep. U. S. Ent. Comm., III (1883), pp. 9, 10, 14.—RILEY, *Stand. Nat. Hist.*, II (1884), pp. 194-195, fig. 272.—COOK, *Beal's Grasses N. A.*, I (1887), pp. 373, 396.—RILEY, *Ins. Life*, I (1888), p. 87.—WEED, *Bull. Ohio Agric. Exp. St., Techn. Ser.*, I (1889), p. 40.—LUGGER, *Rep. Agric. Exp. St. Minn.* (1889), p. 340, fig. 17.—OSBORN, *Ins. Life*, IV (1891), pp. 50, 55.—RILEY, *ibid.*, IV (1891), p. 145.—OSBORN, *Rep. Ent. Soc. Ont.*, XXII (1891), pp. 70, 73.—RILEY, *Bull. Div. Ent. U. S. Dep. Agric.*, XXV (1891), pp. 31, 32, fig. 9.—OSBORN, *ibid.*, XXVII (1892), pp. 59-64.—MILLIKEN, *Ins. Life*, VI (1893), pp. 19, 21.
- ? *Pezotettix sumichrasti* SAUSSURE, *Rev. Mag. Zool.*, 1861 (1861), pp. 160-161; *Orth. Nova Amer.*, II (1861), p. 11.
- Aceridium (Caloptenus) birittatum* UHLER (pars), *Harr. Treat. Ins. Inj. Veg.* (1862), p. 174.
- Aceridium birittatum* THOMAS, *Trans. Ill. St. Agric. Soc.*, V (1865), p. 449.
- Melanoplus birittatus* SCUDDER! (pars), *Hitchc. Rep. Geol. N. H.*, I (1874), p. 376; *Rep. U. S. Ent. Comm.*, II (1881), app., p. 24.—BRUNER, *ibid.*, III (1883), p. 60; *Bull. Washb. Coll.*, I (1885), p. 139.—RILEY, *Rep. U. S. Ent.*, 1885 (1886), p. 233.—BRUNER, *ibid.*, 1885 (1886), p. 307.—RILEY, *Ins. Life*, II (1889), p. 27.—FLETCHER, *Rep. Exp. Farms Can.*, 1888 (1889), p. 63.—TOWNSEND, *Proc. Ent. Soc. Wash.*, II (1891), p. 43.—BLATCHLEY! (pars), *Can. Ent.*, XXIII (1891), pp. 99-100.—BRUNER (pars), *ibid.*, XXIII (1891), p. 193; *Ins. Life*, III (1891), p. 229; (pars), *ibid.*, IV (1891), pp. 21-22, 146; (pars), *Rep. Ent. Soc. Ont.*, XXII (1891), p. 48; *Bull. Div. Ent. U. S. Dep. Agric.*, XXIII (1891), p. 14; *ibid.*, XXVII (1891), pp. 12-29, 33.—MCNEILL, *Psyche*, VI (1891), p. 74.—BRUNER, *Rep. St. Bd. Agric. Nebr.*, 1891 (1891), pp. 243, 307-308, figs. 85-86.—KELLOGG, *Ins. Life*, V (1892), p. 116.—OSBORN, *Proc. Iowa Acad. Sc.*, I, Pt. II (1892), p. 118.—KELLOGG, *Inj. Ins. Kans.* (1892), pp. 42-43, figs. 22, 23 b.—NUTTING, *Bull. Lab. Nat. Hist. Univ. Iowa*, II (1893), p. 291.—BRUNER (pars), *Bull. Div. Ent. U. S. Dep. Agric.*, XXVIII (1893), pp. 19-21, fig. 8; *ibid.*, XXX (1893), p. 35; *Publ. Nebr. Acad. Sc.*, III (1893), p. 27; *Rep. Nebr. St. Bd. Agric.*, 1893 (1893), pp. 461-462, figs. 104-105; *Ins. Life*, VI (1893), p. 34.—COOK, *Trans. Amer. Ent. Soc.*, XX (1894), p. 337.—BRUNER, *Rep. St. Hort. Soc. Nebr.*, 1894 (1894), pp. 163, 205, fig. 71.—MORSE (pars), *Psyche*, VII (1894), p. 106.—BLATCHLEY, *Can. Ent.*, XXVI (1894), pp. 244-245.—BRUNER, *Bull. Div. Ent. U. S. Dep. Agric.*, XXXII (1894), p. 12; *Nebr. St. Hort. Rep.*, 1895 (1895), p. 69.
- tettix birittatus* Stål, *Bih. K. Sv. Vet.-Akad. Handl.*, V, No. 9 (1878), p. 14.—FARMAN, *Orth. Ky.* (1894), p. 8.
- of the above references belong with little doubt to *M. femoratus*, with which it has often been confounded, but whenever it was not clear that they referred to *M. femoratus* I have retained them here.]

Living in general ground color from fusco-testaceous to very dark brownish fuscous, striped with fulvo- or pallid testaceous. Head flavo-testaceous, more or less infuscated, the summit with a broad median brownish fulvous stripe, which extends backward from the

front of the fastigium but avoids the eyes; vertex gently tumid, the interspace between the eyes broad, equaling the frontal costa, the fastigium broadly, equally, and very shallowly sulcate; frontal costa broad, subequal, with rounded margins, feebly sulcate at and below the ocellus, feebly punctate laterally; eyes as in *M. femoratus*; antennae ferruginous, more or less considerably and broadly infuscated apically, about as long (male) or about two-thirds as long (female) as the hind femora. Pronotum enlarging a little from in front backward, more feebly in the male than in the female, the disk as in *M. femoratus*, the median carina slight but distinct throughout, generally slighter (but only a little) between the sulci, the lateral carinae obscure, consisting of a rounded angle, the front margin very feebly convex, the hind margin broadly rounded or obtusely rotundato-angulate; prozona distinctly longitudinal (male) or quadrate (female), generally a third (male) or a fourth (female) longer than the metazona, with very faint and exceedingly sparse punctation, the metazona finely and closely punctate; disk very dark brownish fuscous, rather broadly bordered laterally, including the lateral carinae, with an equal, generally percurrent, fulvo-testaceous or pallid testaceous stripe, usually half as broad as the frontal costa, and which is bordered more or less narrowly and irregularly on the lateral lobes of the prozona with blackish fuscous, fading below into fuscous, except in the sulci. Prosternal spine as in *M. femoratus*. Tegmina attaining or a little surpassing the hind femora, generally longer in the male than in the female (in a single instance seen, a female, no longer than the femora themselves) brownish or blackish fuscous, the anal vein marked by a slender flavous stripe, the discoidal area not darker than the rest, generally almost clear but frequently with faint and delicate mottling; wings hyaline, the cross-veins, except in the inner half of the expanded anal area, fuscous. Fore and middle femora ferruginous, more or less heavily infuscated above; hind femora rather long and moderately stout, ferrugineo-testaceous, the outer and generally the inner faces black above, flavo-testaceous below, the inner half of the upper face thrice very broadly banded with black, the genicular arc and a basal transverse stripe across the lower genicular lobe black on both sides; hind tibiae passing more or less gradually, at varying points but generally near the middle, from purplish at the base to greenish yellow (very rarely red or reddish) at the tip, the patella of the lighter color, followed in lighter examples by a narrow black annulus, the spines black almost or quite to their base, ten to thirteen in number in the outer series. Extremity of male abdomen clavate, rounded, well upturned, the supraanal plate clypeate, with strongly sinuous sides, rectangulate tip, a slender percurrent very deep median sulcus, bounded in the basal half or more by sharp walls, between which and the lateral margins the whole plate is longitudinally hollowed; cerci very broad, laminate, externally convex, gently incurved, surpassing the supraanal plate, shaped almost precisely as in *M. femoratus* but more elongate, and with the

upper lobe of the expanded extremity bent at a lesser angle with the basal portion; infracercal plate shorter than the supraanal, scarcely surpassing its lateral margins; subgenital plate moderately narrow, at apex considerably and abruptly elevated and thickened, hardly prolonged posteriorly.

Length of body, male, 27 mm., female, 37 mm.; antennae, male, 14.75 mm., female, 13 mm.; tegmina, male, 20.5 mm., female, 26.5 mm.; hind femora, male, 15 mm., female, 20 mm. Specimens in Texas grow to a much larger size, and it is very variable in this respect.

One hundred and twenty-nine males, 141 females. Franklin County, Ohio. Lesquereux (Museum Comparative Zoology); Vigo and Fulton counties, Indiana, W. S. Blatchley; Chicago, Illinois; Rock Island Illinois, Walsh; Moline, Rock Island County, Illinois, McNeill; southern Illinois, Kennicott; St. Louis, Missouri, Engelmann; Iowa (U.S.N.M.—Riley collection): Dallas County, Iowa, August 8–10, September 1–3, J. A. Allen; Jefferson, Greene County, Iowa, July 20–24, Allen; Crawford County, Iowa, July 15–24, Allen; Minnesota, Uhler; Lake Winnipeg, Manitoba, Scudder (Museum Comparative Zoology); Winnipeg, Manitoba, Kennicott, Gunn (Uhler); Custer, South Dakota, Bruner (U.S.N.M.—Riley collection); Dakota, Rothhammer; Nebraska, Dodge; Nebraska, A. Agassiz (Museum Comparative Zoology); Fort Robinson, Dawes County, Nebraska, Bruner (U.S.N.M.—Riley collection); North Fork of Platte River, Hayden; West Point, Cuming County, Nebraska (L. Bruner); Nebraska City, Otoe County, Nebraska, Hayden; Ellis, Kansas (Museum Comparative Zoology); Fort Hayes, Kansas, Allen (same); Lakin, Kearny County, Kansas, 3,000 feet; between Smoky Hill, Kansas, and Denver, Colorado, L. Agassiz (Museum Comparative Zoology); Texas, October 1, November 10, Belfrage (U.S.N.M.—Riley collection; S. H. Scudder); northern Texas, Uhler; Dallas, Texas, Boll (Museum Comparative Zoology; S. H. Scudder); Pecos River, Texas, Captain Pope; Taos, New Mexico (U.S.N.M.—Riley collection); Colorado (Museum Comparative Zoology); Colorado, 5,500 feet, Morrison (U.S.N.M.—Riley collection; S. H. Scudder); Garland, Costilla County, Colorado, 8,000 feet, August 28–29; Veta Pass, Costilla County, Colorado (U.S.N.M.—Riley collection); Pueblo, Colorado, 4,700 feet, August 30–31; Grenada and Las Animas, Bent County, Colorado; Colorado Springs, El Paso County, Colorado, E. S. Tucker (University of Kansas); Clear Creek Canyon, Jefferson County, Colorado, Packard (Museum Comparative Zoology); Pacific R. R. expl., latitude 38°, Lieutenant Beckwith; Grand Junction, Mesa County, Colorado (L. Bruner); White River, Rio Blanco County, Colorado, (U.S.N.M.—Riley collection; S. H. Scudder); Fort Collins, Larimer County, Colorado, Buffum (U.S.N.M.—Riley collection); Utah, Gorman (Museum Comparative Zoology); American Fork Canyon, Utah, 9,500 feet, August 23; Salt Lake Valley, Utah, 4,300 feet, August 1–4; Spring Lake Villa, Utah County, Utah, August 1–4, Palmer; Wyoming,

Morrison (U.S.N.M.—Riley collection): North Pacific Railroad survey, George Suckley; upper Missouri River, Hayden; head waters of Missouri and Yellowstone, Hayden; Medicine Hat, Assiniboia, Canada, (U.S.N.M.—Riley collection); Fort McLeod, Alberta, Canada (same); various localities on the Yakima River, Washington (Museum Comparative Zoology); Loon Lake, Colville Valley, Washington, July 25 (same); Spokane, Washington, July 21–22 (same); Puget Sound, C. B. Kennerly.

It has also been reported from Tennessee and Mississippi (Thomas), Nevada (Riley), Idaho (Thomas, Milliken), Souris River, Alberta, Canada (Scudder), Grand Rapids, N.W. T. (Nutting), and Victoria (Fletcher); also, possibly, from Mexico (Saussure). It therefore probably ranges from southern Canada to the Gulf, but is unknown along the Atlantic Seaboard, and wholly unreported from the Pacific Slope south of Washington, (unless, as above, in Mexico) and it hardly ranges as far north as *M. femoratus*.

Bruner in one of his accounts of this species says it is "a lover of rank and succulent vegetation, such as is found upon bottom lands, along the edges of cultivated fields, at the margins of woodlands and on the shaded mountain slopes." When "it develops in large numbers, then these haunts are forsaken, to a greater or less extent, and it spreads over cultivated fields, eating the choicest of everything." In Iowa, Mr. J. A. Allen found it common on dry prairies, as well as in moist sloughs on tall grass.

It seldom develops any marked migratory propensity and its egg-laying habits "differ considerably from those of the smaller migratory species, insomuch as but one or two clusters or pods are deposited by a single female. Nevertheless, just as many eggs are laid by each female insect. These eggs are deposited in prairie sod or any compact soil in the vicinity of the regular haunts or feeding places. Old roads and closely cropped pastures, when located handily, are favorite resorts for the heavily laden females when attending to this mission of theirs." (Bruner.)

Its destructiveness appears to be mainly confined to grass, grain, and garden vegetables. It appears in the winged state the last of June or early in July, but eggs are not laid until late in August; sixty-two to seventy-two eggs have been counted in the egg pods by Donald Gunn in Manitoba.

Blatchley has taken the male of this species *in coitu* with *M. femoratus*, and considers them the same species, as do many others. The range of the two species, which are certainly very closely allied, differs to a considerable extent, though both are found over a large extent of territory side by side; one is a seaboard and northern form, the other an interior species. Besides the differences in the hind tibiae, which rarely cause hesitation in attempting to separate them, there are slight differences which I have attempted to state, in the abdominal append

ages and in the tegmina, besides some distinction in the general coloration.

The specimens from Grand Junction, Colorado, mentioned above as in Bruner's collection, are short winged and indicate occasional dimorphism in this species.

127. *MELANOPLUS THOMASI*, new species.

(Plate XXV, fig. 1.)

Melanoplus thomasi BRUNER!, MS.

Dark plumbeo-olivaceous, the abdomen dark ferruginous. Head marked with flavo-testaceous below and on the inner side of the eyes above, above the antennal scrobes, along the lateral edges of the frontal costa, and in a broad stripe behind the upper part of the eyes, which passes backward; vertex gently tumid; interspace between the eyes scarcely narrower than the frontal costa, the fastigium broadly and rather shallowly sulcate in front, the frontal costa broad, equal, delicately punctate, shallowly sulcate at and below the ocellus; eyes moderately large, not very prominent, about as long as the infraocular portion of the genae; antennae reddish becoming infuscated apically, a little shorter (male) than the hind femora. Pronotum subequal, enlarging a very little posteriorly, the front margin nearly truncate, the hind margin very broadly angulate, the disk nearly plane, separated by subdistinct but rounded lateral carinae from the subvertical, slightly tumid, lateral lobes, the median carina distinct on the metazona, very feeble on the prozona, the smooth prozona considerably and roundly emarginate in the middle half behind, distinctly longitudinal, nearly a half longer than the closely but shallowly punctate metazona, with a moderately broad, equal, flavo-testaceous stripe on either side of the disk of the whole pronotum, limited by the lateral carinae, the lateral lobes nearly uniform dark plumbeo-olivaceous, but deeper in color above than below. Prosternal spine stout, rather long, cylindrical, blunt, enlarging slightly on apical half as seen from the front. Tegmina not reaching the tip of the femora, testaceous with dark veins, a flavo-testaceous stripe following the anal vein; wings pellucid, the veins testaceous or fusco-testaceous, colorless in the lower half of the anal area. Femora dark plumbeo-olivaceous, the hind pair tinged above with ferruginous, the lower half of the outer side flavous, the inner and lower face coralline, with a faint pregenicular flavous annulus more or less complete, preceded on the inner side above by a fuscous patch, the genicular are plumbeo-fuscous; hind tibiae wholly coral red, the spines black at the base, eleven in number in the outer series. Extremity of male abdomen somewhat clavate, rounded, a little upturned, the supra-anal plate broad and triangular with sinuate lateral margins, rectangular apex, nearly plane, but with a rather broad and shallow median longitudinal sulcus in the basal half, bordered by rather low walls, and a pair of apical, distant and subparallel, short, gently arcuate, slight

ridges; furcula consisting of a pair of subsemicircular distant lobes, projecting from the middle of the thickened plates occupying the inner portion of the last dorsal segment, the projecting portion lying outside the bases of the ridges bordering the basal sulcus of the supraanal plate; cerci large, broad, and rather stout, apically a little incurved, broadly constricted mesially as seen from the side, the apical portion triangularly expanded above, truncate after a slight expansion below, the apical margin broadly convex, subtruncate; infracercal plates about as long as the supraanal plate, in the apical half a little expanded beyond the lateral margins of the same; subgenital plate moderately narrow, considerably prolonged and elevated apically, as well as thickened.

Length of body, male, 33 mm.; antennae, circ. 16 mm.; tegmina, 25 mm.; hind femora, 18.5 mm.

One male. Lerdo, Durango, Mexico, November (L. Bruner).

This species is rather nearer to *M. femoratus* than to *M. bivittatus*, though geographically separated more widely from the former.

128. MELANOPLUS YARROWII.

(Plate XXV, fig. 2.)

Caloptenus yarrowii THOMAS, Rep. Geol. Geogr. Expl. 100th Mer., V (1875), p. 894, pl. XLV, fig. 5; Rep. U. S. Ent. Comm., I (1878), p. 43.—BRUNER, *ibid.*, III (1883), p. 60.

Light brownish yellow, somewhat cinereous, nearly uniform. Head nearly uniform, hardly darker above, the vertex gently tumid, the interspace between the eyes not very broad, distinctly narrower than the frontal costa, the fastigium feebly sulcate throughout; frontal costa moderately broad, slightly broader below than above, failing to reach the clypeus, very feebly and broadly sulcate below the ocellus, punctate on either side; eyes moderate, only feebly prominent, hardly longer than the infraocular portion of the genae; antennae red. Pronotum feebly enlarging apically, the front margin truncate, the hind margin bluntly and very obtusely angulate, the disk nearly plane, the lateral lobes subvertical; median carina feeble, subobsolete between the sulci; lateral carinae very rounded; prozona nearly smooth, scarcely longitudinal (male) or quadrate (female), but little longer than the metazona, its middle sulcus transverse, the posterior sinuate; metazona closely and rather finely punctate; pronotum without markings except a faint slender flavous streak along the discal side of the lateral carinae and, in the male at least, some irregular blackish fuscous blotches on the lateral lobes. Prosternal spine moderately long, conico-cylindrical, blunt, erect. Tegmina reaching the tip of the hind femora, brownish testaceous without markings, tapering very gently and regularly to a well-rounded tip; wings pellucid with a feeble greenish tinge, the veins and cross veins fuscous only above the anal area, except to a slight degree. Hind femora olivaceo-testaceous, more or less infumated above and on the outer face, the lower carina of the outer face flavous, and

dull flavous beneath, with a median and postmedian fuscous patch on the upper half of the inner face, the genicular are plumbeous or fusco-plumbeous; hind tibiae red, the spines black except at extreme base, ten to thirteen in number in the outer series. Extremity of male abdomen feebly clavate, rounded, upturned, the supraanal plate broad, rounded triangular, the lateral borders slightly bent in the middle, with a narrow, moderately deep, percurrent, median sulcus with moderately high, not very sharp walls, on either side of the posterior extremity of which is a similar, parallel, short ridge; furcula present only as the sharply rectangulate inner corners of the slightly parted lateral halves of the last dorsal segment; cerci broad, stout, laminate, faintly convex, considerably and regularly incurved, the basal half tapering gently, beyond the middle expanding considerably, more above than below, into a flabellate pad considerably broader than long, bluntly rounded above and below, with nearly straight and truncate, but not broadly truncate, posterior margin, the whole fully as long as the supraanal plate; infra-cercal plates broader than the apical half of the supraanal plate, no longer than it, narrowing rapidly and roundly; subgenital plate rather broad and short, considerably elevated and prolonged apically, entire, extending far beyond the supraanal plate.

Length of body, male, 25.5 mm., female, 33 mm.; tegmina, male, 19 mm., female, 21 mm.; hind femora, male, 13.5 mm., female, 16.5 mm.

One male, 1 female. Grand Junction, Mesa County, Colorado, August 28, C. P. Gillette, through L. Bruner

Although Thomas's description of *C. yarrowii* was based upon a female only, I am tolerably confident that this species is to be referred to it; it certainly fits it better than any known to me, and its reference here was suggested to me by Professor Bruner. Thomas gave no locality beyond "found in the collection," which was made in "portions of Nevada, Utah, California, Colorado, New Mexico and Arizona." He afterwards mentions it as "probably from Arizona, but possibly from Nevada," without giving reasons. From all that appears it might have come as well from Colorado or Utah.

129. *MELANOPLUS OLIVACEUS*, new species.

(Plate XXV, fig. 3.)

Melanoplus olivaceus BRUNER!, MS.

Dark brownish testaceous with an olivaceous tint, nearly uniform in coloring. Head varying in front from dark olivaceous to fuscous or ferruginous, the vertex like the rest of the body and gently tumid; interspace between the eyes only moderately broad, distinctly narrower than the frontal costa; fastigium very slightly and broadly sulcate; frontal costa moderately broad and equal, hardly reaching the clypeus, seriatly punctate at the sides, more or less shallowly sulcate excepting above; eyes moderately large, rather prominent especially in the male, considerably longer, at least in the male, than the infraocular

portion of the genae; antennae red, infuscated apically. Pronotum subequal, scarcely expanding posteriorly even in the female, the front margin subtruncate, the hind margin broadly angulate. the angle rounded; disk very feebly convex and separated by subdistinct lateral carinae formed of a rounded angle from the subvertical lateral lobes, the median carina distinct but slight on the metazona, feeble on the prozona, sometimes subobsolete between the sulci; prozona smooth. distinctly longitudinal (male) or subtransverse (female), a third (male) or scarcely (female) longer than the finely and closely punctate metazona, the principal sulcus between them straight; without lighter markings at the lateral carinae, the lateral lobes more or less but feebly discolored, the posterior lobe of the prozona usually the darker. Prosternal spine rather long, moderately stout, subcylindrical, blunt, a little retrorse. Tegmina surpassing the hind femora, rather slender, tapering very feebly, brownish testaceous without longitudinal stripes. Fore and middle femora plumbeo-olivaceous, somewhat tumid in the male; hind femora brown or ferruginous above, dark olivaceous on the outer face. dull flavous beneath and on the inner side, but on the latter more or less interrupted with fuscous above, the genicular are brownish testaceous; hind tibiae wholly coral red, the spines black almost to the base, ten to twelve in number in the outer series. Extremity of male abdomen feebly clavate, upturned, the supraanal plate triangular with gently sinuate margins, subrectangulate apex, nearly flat, with a very broad and obscure, feebly percurrent, longitudinal sulcus, bounded by low broad walls, a little constricted in the apical half; furcula consisting of a pair of slight acuminate denticulations, arising from the thickened inner extremities of the divided halves of the last dorsal segment, and overlying the ridges bounding the median sulcus of the supraanal plate; cerci large and broad, gently incurved, slightly tapering on the basal half, and then expanding into a transversely suboval apical flabellation, nearly half as broad again as the extreme base, expanding more above than below, the apical margin broadly convex, the whole considerably surpassing the supraanal plate; infracercal plates surpassing but slightly the sides of the supraanal plate, about as long as it; subgenital plate moderately broad, the lateral margins hardly elevated apically, but considerably prolonged, subtuberculate.

Length of body, male, 23 mm., female, 29 mm.; tegmina, male, 20 mm., female, 24.5 mm.; hind femora, male, 13.75 mm., female 15.75 mm.

Three males, 2 females. Los Angeles, California, Coquillett, July (L. Bruner; U.S.N.M.—Riley collection).

This is the smallest and at the same time the slightest species in this series.

28. PUNCTULATUS SERIES.

This group is composed of species with prominent head and rapidly declivent fastigium, and, in the male, very prominent eyes. The joints of the antennae are unusually long. The pronotum is rather short and

in front rather flaring to receive the head, the prozona quadrate (male) or distinctly transverse (female), the prosternal spine short, conical, and erect, and the interval between the mesosternal lobes relatively broad. The tegmina are fully developed, longer than the hind femora, maculate over their whole breadth. The hind femora are twice rather narrowly belted with black, and the hind tibiae red, more or less obscured.

The supraanal plate of the male is triangular, the furcula very slight or wanting, the cerci very large and broad, immensely expanded apically and flabellate, with convex apical margin, the subgenital plate very much prolonged and greatly elevated apically.

The insects are of medium or large size and dark color, much mottled, and live as far as known only on coniferous trees. Two species are known, one from the Southwest, the other over a large part of the country east of the Rocky Mountains.

130. *MELANOPLUS ARBOREUS*, new species.

(Plate XXV, fig. 5.)

Dull grimy olivaceous, heavily spotted and clouded with brownish and blackish fuscous, giving it a more or less conspicuously mottled appearance. Head very large and exceptionally prominent; in brightest specimens livid or dull pale flavous, heavily and irregularly flecked with very dark olivaceous inclining to blackish fuscous, forming more or less well-marked stripes, bordering the upper part of the eyes and following the median line of the vertex; vertex tumid; interspace between the eyes rather narrow, narrower than the frontal costa; fastigium rapidly declivent, sulcate, the sulcation broadening a little anteriorly; frontal costa moderately broad, equal, laterally punctate, at and below the ocellus sulcate; eyes large, very prominent, particularly in the male; antennae pale flavous, becoming ferruginous apically, infuscated broadly and obscurely at intervals throughout, a little longer (male) or a little shorter (female) than the hind femora. Pronotum very feebly subsellate, the metazona flaring slightly and the prozona distinctly, though over but little space, to receive the head, the front margin faintly convex, the hind margin broadly angulate, the angle broadly rounded, the whole brownish fuscous or yellowish brown, more or less mottled (except on the metazona) with olivaceous or dull flavous and with fuscous, the latter (sometimes tinged with olivaceous) forming on the upper half of the lateral lobes a broad more or less broken band; prozona gently convex transversely, passing insensibly into the inferiorly vertical lateral lobes, quadrate (male) or distinctly transverse (female), a half (male) or a fourth (female) as long again as the metazona, smooth, the median carina very feeble, subobsolete between the sulci, but distinct though slight on the metazona; the latter punctate, with feebly indicated lateral carinae. Prosternal spine short, conical, bluntly pointed, erect; interval between mesosternal lobes slightly longer than

broad (male) or slightly broader than long (female). Tegmina surpassing considerably the hind femora, gently and feebly tapering from the subbasal expansion to the well-rounded tip, fusco-testaceous with an olivaceous tinge, distantly and uniformly flecked with usually roundish or subquadrate dark fuscous spots, less abundant in the apical third, but not confined at all to the discoidal area; wings smoky pellucid, becoming feebly infuscated apically, the veins and cross-veins mostly blackish fuscous. Fore and middle femora luteo-ferruginous, flecked with dark olivaceous or fuscous; hind femora varying from sordid luteo-fuscous to dull pale olivaceous, rather narrowly and completely bifasciate with black, forming unusually regular transverse bands, the whole apex blackish fuscous or black; hind tibiae plumbeo-fuscous at extreme base, followed by a very narrow black annulus and this by a broader pale annulus, beyond which the tibiae are dull red, obscured above, excepting at apex, and sometimes on the sides for a similar and beneath for a brief distance, with fuscous, often broken into flecks, the whole pilose above; spines black nearly or quite to their base, ten to twelve in number in the outer series. Extremity of male abdomen feebly clavate, much upturned, the supraanal plate broad, triangular, with nearly straight lateral margins, acutangulate tip (too nearly rectangulate in our figure), with a broad and rather shallow median sulcus, interrupted beyond the middle, and in the basal half bounded by moderately high walls; furcula composed of a pair of slight triangular projections at the inner angles of the divided last dorsal segment, overlying the ridges of the supraanal plate; cerci large, subequal on the basal two-fifths or more, then abruptly expanding into a transverse apical flap, twice as broad as the base, the expansion almost wholly on the upper side and at right angles to the basal portion, the apical margin broadly convex, but below emarginate to form a denticulation of the lower posterior angle of the flap, the whole gently incurved and surpassing the supraanal plate; infracercal plates wholly concealed beneath the supraanal plate; subgenital plate moderately broad, very greatly extended and abruptly elevated at the extreme apex.

Length of body, male, 30 mm., female, 44 mm.; antennae, male, 18 mm., female, 16.5 mm.; tegmina, male, 26 mm., female, 31 mm.; hind femora, male, 16 mm., female, 21 mm.

Six males, 2 females. Dallas, Texas, Boll (U.S.N.M.—Riley collection; S. H. Scudder); Gulf coast of Texas, Aaron; Arizona, Schaupp (L. Bruner).

This species is certainly very closely allied to *M. punctulatus*, which not only occurs with it, but over a much wider extent of country; it is a much larger insect and differs in several points in the abdominal appendages of the male, though it is possible that the two should be looked upon as races of a single species.

131. MELANOPLUS PUNCTULATUS.

(Plate XXV, fig. 4.)

- Caloptenus punctulatus* UHLER!, MS. (1862).—SCUDDER!, Bost. Journ. Nat. Hist., VII (1862), p. 465.—SMITH, Proc. Portl. Soc. Nat. Hist., I (1868), p. 150.—WALKER, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 678.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 163.—BRUNER, Can. Ent., IX (1877), p. 145.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 43.—BRUNER, *ibid.*, III (1883), p. 60.
- Caloptenus griseus* THOMAS, Ann. Rep. U. S. Geol. Surv. Terr., V (1872), p. 454.—GLOVER, Ill. N. A. Ent., Orth. (1872), pl. XII, fig. 14.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 165.—BRUNER, Can. Ent., IX (1877), p. 144.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 42.—BRUNER, *ibid.*, III (1883), p. 60.
- Melanoplus punctulatus* SCUDDER!, Hitchc. Rep. Geol. N. H., I (1874), p. 376; Proc. Bost. Soc. Nat. Hist., XIX (1878), p. 285; Ent. Notes, VI (1878), p. 44.—FERNALD, Orth. N. E. (1888), pp. 31, 32; Ann. Rep. Mass. Agric. Coll., XXV (1888), pp. 115, 116.—DAVIS, Ent. Amer., V (1889), p. 81.—SMITH, Cat. Ins. N. J. (1890), p. 413.—MCNEILL, Psyche, VI (1891), p. 74.—SMITH, Bull. N. J. Exp. St., XC (1892), p. 34.—SCUDDER, Psyche, VII (1894), p. 55.—MORSE, *ibid.*, VII (1894), pp. 55, 106.—BEUTENMÜLLER, Bull. Amer. Mus. Nat. Hist., VI (1894), pp. 252, 307.
- Caloptenus helluo* SCUDDER!, Proc. Bost. Soc. Nat. Hist., XVII (1875), p. 476; Ent. Notes, IV (1875), p. 75.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 43.—SCUDDER!, Cent. Orth. (1879), p. 20.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 60.
- Pezotettix helluo* STÅL, Bih. K. Sv. Vet.-Akad. Handl., V, No. 9 (1878), p. 14.
- Melanoplus helluo* SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1878), p. 285; Ent. Notes, VI (1878), p. 44; Psyche, VII (1894), p. 55.—MORSE, *ibid.*, VII (1894), p. 55.
- Melanoplus griseus* BLATCHLEY!, Can. Ent., XXIV (1892), pp. 30-31.—BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 28.—SCUDDER, Psyche, VII (1894), p. 55.—MORSE, *ibid.*, VII (1894), p. 55.—BLATCHLEY!, Can. Ent., XXVI (1894), p. 245.

Dark brownish fuscous much mottled with blackish and often tinged with dull olivaceous, beneath ferrugineo-testaceous. Head varying from pale dull olivaceous to ferrugineo-testaceous, irregularly mottled with blackish fuscous and with a blackish band behind the eyes and a widening median stripe of the same upon the summit; vertex tumid; fastigium rapidly declivent, sulcate throughout, the margins much raised between the eyes, which are separated by a space less than the width of the frontal costa; the latter prominent above, moderate in breadth, subequal, sulcate below the ocellus, sparsely punctate throughout, each point marked by a dark olivaceous dot; eyes large and in the male very prominent, in both sexes much longer than the infraocular portion of the genae; antennae varying from fusco-luteous to fusco-ferruginous, much longer (male) or a little or no shorter (female) than the hind femora. Pronotum subequal, widening a little at the metazona in the female, slightly flaring in front to receive the head, especially in the male, varying from luteo-testaceous to brownish fuscous, often much flecked and punctate with black or blackish fuscous, the lateral lobes more heavily marked above with black on the prozona, forming generally a broken or maculate band; front and hind margin as in

M. arboreus; prozona quadrate (male) or distinctly transverse (female), not more than a third (male) or scarcely (female) longer than the metazona, the feebly tumid disk passing insensibly without lateral carinae into the lateral lobes, though these are sometimes visible in the posterior section as on the metazona; median carina occasionally distinct throughout, but always feebler and sometimes very feeble on the prozona; metazona closely ruguloso-punctate. Prosternal spine short, conical, erect; interval between mesosternal lobes subquadrate (male) or distinctly transverse, but narrower than the lobes themselves (female). Tegmina somewhat surpassing the hind femora, very gradually tapering to a well-rounded apex, fusco-testaceous, sprinkled with moderately large roundish or quadrate fuscous spots; wings pellucid, with a feeble greenish-yellow tinge, feebly infumated apically where the veins and cross veins are blackish fuscous. Fore and middle femora luteo- or olivaceo-testaceous heavily flecked with black, showing a tendency to form a triple belting; hind femora similar, the black forming moderately narrow basal, premedian, postmedian, and apical belts, which do not touch the coralline under and inner surfaces, except the latter in a partial way; hind tibiae dull red, with a postbasal obscure flavous annulus, before which they are sometimes blackened, and beyond which, above and on the sides, often flecked or suffused with plumbeo-fuscous, the serial space between the spines often dull luteous, the whole pilose; spines black nearly or quite to their base, except on the inner side, ten to twelve in number in the outer series, none arising very near the base of the tibiae. Extremity of the male abdomen scarcely clavate, somewhat upturned, the supraanal plate triangular, with convex lateral margins and subrectangulate apex, its median sulcus terminating abruptly in the middle, rather broad, somewhat shallow, bounded by rather sharp walls; furcula entirely wanting; cerci large, broad, the basal half or less subequal, exteriorly convex and punctate, beyond abruptly expanding to nearly double the width in exactly opposite directions, considerably more above than below, but otherwise symmetrical, the apical margin angulato-convex, the whole gently incurved; infracercal plates surpassing the sides of the supraanal plate only at the extreme base and slightly; subgenital plate moderately broad, apically abruptly elevated to a considerable degree and thickened, but only a little prolonged.

Length of body, male, 21 mm., female, 28 mm.; antennae, male, 14.5 mm., female, 12 mm.; tegmina, male, 17 mm., female, 18.5 mm.; hind femora, male, 10.5 mm., female, 12 mm.

Nineteen males, 34 females. Maine, Packard, P. R. Uhler; North Conway, Carroll County, New Hampshire; Andover, Essex County, Massachusetts, November; vicinity of Boston, Massachusetts, Uhler; Cambridge, Middlesex County, Massachusetts, September (Museum Comparative Zoology; S. H. Scudder); Waltham, Middlesex County, Massachusetts, September 5, C. J. Maynard (A. P. Morse); Sherborn, Middlesex County, Massachusetts, September, Mrs. A. L. Babcock

(same); Amherst, Hampshire County, Massachusetts, August 22 (same); Canaan, Litchfield County, Connecticut, August 18 (same); Ellenville, Ulster County, New York, September, Beutenmüller (A. P. Morse; S. H. Scudder); Ithaca, Tompkins County, New York, August 2. 28 (A. P. Morse); Point of Rocks, Frederick County, Maryland, August 19, Pergande (L. Bruner); Middle States, Osten Sacken; Virginia (L. Bruner); Shenandoah Valley, Virginia, October, Packard (Museum Comparative Zoology); Indiana, October 7, Blatchley (A. P. Morse); Fulton County, Indiana, Blatchley; Vigo County, Indiana, Blatchley (A. P. Morse); Putnam County, Indiana, August 20, Blatchley (same); Bloomington, Monroe County, Indiana, Bollman (U.S.N.M.); Illinois, September (L. Bruner); Rock Island, Illinois, Walsh; Dallas, Texas, Boll (U.S.N.M.—Riley collection; S. H. Scudder).

It has also been reported from Vermont (Scudder); Staten Island, New York (Davis); Ocean County, New Jersey (Smith); Ohio (Thomas); Galesburg, Knox County, and Urbana, Champaign County, Illinois (McNeill), and eastern Nebraska (Bruner).

Bruner reports it from oak groves and Smith on cranberry bogs, but Beutenmüller has found that it lives on pine trees. Blatchley found it in the depths of a tamarack swamp, and says it is not an active insect, "usually, after one or two short leaps, squatting close to the earth, and seemingly depending upon the close similarity of its hues to the grayish lichens about it to avoid detection." Others have since found it on coniferous trees, and these are, apparently, its proper station.

24. PHOETALIOTES, new genus.

(Φοιταλιώτης, a roamer.)

Body elongate, rather slender, a little compressed, very feebly pilose, including faintly the tegmina and legs. Head large, full, prominent, relatively elongate, nearly half as long again as the long prozona, the space behind the eyes fully half as long as the breadth of the eyes, the genae a little tumescent, the head apart from the eyes slightly broader than the pronotum; vertex prominent and well arched both longitudinally and transversely; face a little oblique; eyes rounded broad oval, moderately prominent, subtruncate anteriorly, moderately distant, somewhat farther apart than the greatest width of the frontal costa; fastigium very faintly sulcate, almost plane; frontal costa prominent, markedly narrower above than below the ocellus; antennae slender, moderately long, but shorter than the hind femora, though fully twice as long as the pronotum. Pronotum of moderate length, faintly subsellate but otherwise equal, feebly flaring in front to receive the head; disk rounded subtectate, with broadly rounded very indistinct lateral carinae, and a sharp, equal, and percurrent median carina; prozona longitudinal, nearly half as long again as the metazona, with indistinct transverse sulci; front margin subtruncate, hind margin extremely obtusangulate. Prosternal spine rather large, erect, conical, blunt; meso- and metastethia together much more than twice as long as broad;

interspace between mesosternal lobes much (male) or a little (female) longer than broad, the metasternal lobes attingent (male) or approximate (female); portion of metasternum behind the lobes about twice as broad as long and about half as broad as the greatest breadth of the metasternum. Tegmina either abbreviate, broad lanceolate, acuminate, attingent, slightly longer than the pronotum, or fully developed, surpassing the hind femora, rather broad and equal, well rounded at tip, hardly tapering in the distal half, at a distance from the apex equal to the breadth of the tegmina as broad as the metazona, the intercalaries and cross veins of the discoidal area everywhere few, the venation in general loose, irregular, and ill-defined, the humeral vein broadly sinuous, terminating on the costal margin at least as far before the apex as the breadth of the tegmina, nowhere running closely parallel to the costal margin nor gradually merging into it, the area intercalata not reaching the middle of the tegmina. Hind femora long and slender, the genicular lobes pallid with a transverse basal fuscous stripe, the hind tibiae glaucous, sometimes yellowish, with eleven to thirteen spines in the outer series. Abdomen compressed, mesially carinate, apically clavate and recurved in the male, the subgenital plate narrow and long, with lateral margins ampliate at base, the apical margin mesially pinched but not elevated, the apical face with no subapical tubercle; furcula delicately developed; cerci compressed styliform, rather small; ovipositor of female normally exerted.

This genus is very closely related to *Melanoplus*, from which it is to be distinguished by its large tumid head and subsellate equal pronotum, as well as by its substyliform cerci, though the last characteristic is found in some degree in a couple of species of *Melanoplus*. The neuration of the tegmina, when the latter are developed, also differs to a certain degree, pointed out in the descriptions. Bruner¹ has already expressed the opinion that this type should be generically dissociated from other *Melanopli*.

A single species is known, found in the western Mississippi basin and beyond its latitudinal limits from Alberta to Mexico.

PHOETALIOTES NEBRASCENSIS.

(Plates I, fig. e; XXV, figs. 6, 7.)

Pezotettix megacephala THOMAS, MS., fide Dodge, Can. Ent., IV (1872), p. 15—undescribed.

PHOETALIOTES NEBRASCENSIS NEBRASCENSIS.

(Plate XXV, fig. 6.)

Pezotettix nebrascensis THOMAS, Ann. Rep. U. S. Geol. Surv. Terr., V (1872), p. 455.—GLOVER., Ill. N. A. Ent., Orth. (1872), pl. XIII, fig. 2.—THOMAS, Rep. U. S. Geol. Surv. Terr., V (1873), p. 151.—BRUNER, Can. Ent., IX (1877), p. 144.—STÂL, Bih. K. Sv. Vet.-Akad. Handl., V, No. 9 (1878), p. 14.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 59; Bull. Washb. Coll., I (1885), pp. 136-137; Rep. U. S. Ent. (1885-86), p. 307.—OSBORN, Proc. Iowa Acad. Sc., I, Pt. II (1892), p. 117.

¹ Bull. Washb. Coll., I, p. 37.

Pezotettix autumnalis DODGE!, Can. Ent., VIII (1876), p. 10.—BRUNER, *ibid.*, IX (1877), p. 144; Rep. U. S. Ent. Comm., III (1883), p. 59.—MCNEILL, *Psyche*, VI (1891), p. 76.

Caloptenus sunguinocephalus LA MUNYON, Proc. Nebr. Ass. Adv. Sc. (1877), March 8, 1877.

Euprepocnemis nebrascensis BRUNER, Pub. Nebr. Acad. Sc., III (1893), p. 28.

PHOETALIOTES NEBRASCENSIS VOLUCRIS.

(Plates I, fig. c; XXV, fig. 7.)

Caloptenus volucris DODGE. Can. Ent., IX (1877), p. 112.—BRUNER, *ibid.*, IX (1877), p. 145.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 43.—BRUNER, *ibid.*, III (1883), p. 60.

Fusco-testaceous, flavous beneath. Head flavo-testaceous, in fresh specimens more or less fusco-olivaceous, much infuscated above, with a broad piceous postocular band, and often with a pair of divergent fuscos or ferrugineous stripes on the summit; vertex very tumid, distinctly elevated above the level of the pronotum, the interspace between the eyes twice (male) or thrice (female) as broad as the first antennal joint; fastigium rather rapidly declivent, with scarcely perceptible sulcation; frontal costa not nearly reaching the clypeus, much broader below than above the ocellus, the change rather abruptly effected and more striking in the female than in the male, at its broadest considerably narrower than the interspace between the eyes, distinctly impressed at the ocellus, and in the male sulcate below it, punctate throughout, above biserially; eyes moderately large, rather prominent, with no great difference between the sexes, fully as long as (female) or distinctly longer than (male) the infraocular portion of the genae; antennae testaceous, feebly infuscated apically, about four-fifths (male) or three-fifths (female) as long as the hind femora (but in southern examples of *P. n. nebrascensis* relatively longer). Pronotum equal, except for being faintly subsellate, especially in the male, the disk ferrugineo-fuscos, rounded subtectate, passing by a very broadly and uniformly rounded shoulder, forming a semblance of blunt lateral carinae, into the anteriorly feebly tumid vertical lateral lobes, which are more or less flavous below, and above are marked on the prozona with a very broad piceous postocular band, generally broader on the posterior section and occasionally broken there; median carina sharp but not high, equal, percurrent; front margin subtruncate, hind margin very obtusangulate, in the female often rotundato-obtusangulate; prozona distinctly longitudinal in both sexes, sparsely and shallowly and sometimes very obscurely punctate, nearly half as long again as the densely and finely punctate metazona. Prosternal spine rather long, erect, conical, blunt; interspace between mesosternal lobes about two and a half times longer than broad (male) or about half as long again as broad (female). Tegmina slightly longer than the pronotum, broad lanceolate, attingent, the costal margin angulato-convex, the tip bluntly acuminate, ferrugineo-testaceous (*P. n. nebrascensis*), or surpassing a little the hind femora, overlapping, rather broad, remarkably equal, the apex well

rounded, ferrugineo-testaceous in the basal half, beyond subhyaline with fusco-testaceous veins and cross veins (*P. n. volucris*, Plate I, fig. e); wings in the latter form about as long as the tegmina, moderately broad, hyaline with fusco-olivaceous or fusco-ferruginous veins becoming increasingly infuscated apically. Fore and middle femora a little tumid in the male; hind femora flavo-testaceous, generally more or less infuscated or fusco-olivaceous in the upper half of the outer face, the inner side and outer carina of the upper face and upper limit of the inner face more or less distinctly and rather narrowly bifasciate or bimaculate with fuscous; lower face flavous sometimes deepening into roseate; upper genicular lobe and base of lower genicular lobe blackish fuscous; hind tibiae usually glaucous, sometimes lighter, sometimes darker, occasionally yellowish, with a subbasal blackish annulus and the apex fuscous or flavescent, the spines black almost or quite to the base, twelve to thirteen, rarely eleven, in number in the outer series. Extremity of male abdomen feebly clavate, a little recurved, the supraanal plate triangular with slightly convex sides and feebly acutangulate apex, the median sulcus rather broad and equal, reaching only the middle of the plate and there fading abruptly, the moderately high walls terminating against a feebly transverse plica; furcula consisting of a pair of very slender and brief needles overlying the submedian ridges of the supraanal plate, not nearly so long as the last dorsal segment; cerci compressed substyliform, moderately broad at base, tapering more rapidly in the basal than in the apical half, bluntly acuminate at tip and about as long as the supraanal plate; subgenital plate narrow and apically narrowing slightly, the lateral and apical margins in about the same plane, the apical margin laterally compressed mesially, so as to simulate an apical tubercle, entire.

Measurements: P. n. nebrascensis (Colorado).—Length of body, male, 22 mm., female, 23 mm.; antennae, male, 9.5 mm., female, 7 mm.; tegmina, male, 6 mm., female, 6.5 mm.; hind femora, male, female, 11.75 mm. (Texas), body, male, 22.5 mm., female, 30 mm.; antennae, male, female, 11 mm.; tegmina, male, 6 mm., female, 7.5 mm.; hind femora, male, 13 mm., female, 15.25 mm. *P. n. volucris* (male, Nebraska; female, Montana), body, male, 23 mm., female, 24 mm.; antennae, male, 9 mm., female, 7.25 mm., tegmina, male, 18.5 mm., female, 18 mm.; hind femora, male, 11.2 mm., female, 12.5 mm. (Texas), body, male, 24 mm., female, 28.5 mm.; antennae, male, 10.5 mm., female, 9 mm.; tegmina, male, 18.25 mm., female, 20 mm.; hind femora, male, 13.5 mm., female, 15 mm.

Twenty-seven males, 28 females. Medicine Hat, Assiniboia, September (U.S.N.M.—Riley collection); Fort McLeod, Alberta, September (same); Glendive, Dawson County, Montana (L. Bruner); Wyoming, Morrison (U.S.N.M.—Riley collection); Nebraska, Dodge, October (same; S. Henshaw; S. H. Scudder); Gordon, Sheridan County, Nebraska, September (U.S.N.M.—Riley collection); Fort Robinson,

Dawes County, Nebraska, August 21, Bruner (same); Ogalalla, Keith County, Nebraska, August 31 (L. Bruner); West Point, Cuming County, Nebraska, September (U.S.N.M.—Riley collection; L. Bruner); Omaha, Douglas County, Nebraska, September (U.S.N.M.—Riley collection); Cordova, Rock Island County, Illinois, September 28, J. McNeill; Lakin, Kearny County, Kansas, 3,000 feet, September 1; between Smoky Hill, Kansas, and Denver, Colorado, September, L. Agassiz (Museum Comparative Zoology); Pueblo, Colorado, 4,700 feet, August 30-31; Dallas, Texas, Boll (U.S.N.M.—Riley collection; S. H. Scudder); Fort Worth, Tarrant County, Texas, May (U.S.N.M.—Riley collection); Tucson, Pima County, Arizona (same); Montelovez, Cohahuila, Mexico, September 20, E. Palmer; Sierra de San Miguelito, San Luis Potosi, Mexico, E. Palmer; Guanajuato, Mexico, A. Dugès (U.S.N.M.); Queretaro, Mexico, November (L. Bruner); Talpan, Mexico, November (same).

The species has also been reported from Colona, Henry County, Illinois (McNeill), Topeka, Shawnee County, Kansas (Bruner), Iowa (Osborn), and Dakota (Bruner). McNeill states that the species was to be found at Cordova, Illinois, only "in a large orchard on the east side of a high hill."

P. n. volucris has been seen by me from Montana, Wyoming, Nebraska, Texas, Arizona, and Mexico; *P. n. nebrascensis* from all the general regions mentioned excepting Montana, Wyoming, and Arizona. Bruner long ago pointed out the dimorphism. The antennae of southern examples are relatively longer than in those from northern stations, at least in the form *P. n. nebrascensis*.

23. PAROXYA.

(*Παρά*, beside; *Oxya*, a genus of *Aceridiinae*.)

Paroxya SCUDDER, Proc. Bost. Soc. Nat. Hist., XIX (1877), pp. 28-29.

Body straight, subcylindrical, briefly pilose. Head moderately large, not prominent, the face subdeclivent, the eyes large, prominent, half as long again (female) or twice as long (male) as the anterior infraocular portion of the genae, separated from each other above by fully (male) or very much more than (female) the width of the basal joint of the antennae; fastigium rather broad, slightly sulcate; frontal costa rather prominent above and punctate, subequal, percurrent, feebly sulcate, about as broad as the interspace between the eyes; antennae long, half or much more than half the length of the body in the male, equal, the joints subdepressed, beyond the middle punctate. Dorsum of pronotum twice as long as the average width, at least in the male. subequal throughout, there being no median constriction, transversely very broadly tectate, nearly plane, the median carina slight, equal, percurrent, the lateral carinae distinct but blunt, the prozona only about a third (or less) longer than the metazona, the hind border of latter

obtusely and bluntly angulate; lateral lobes vertical, their lower border very obtusely angulate in the middle. Prosternal spine prominent, subcylindrical, bluntly pointed, laterally compressed at the base, at least in the male; mesosternal lobes narrowly separated in both sexes; metasternal lobes subattinent (male) or as distant as the mesosternal lobes (female). Tegmina and wings variable, but at least as long as the pronotum. Hind femora reaching or generally surpassing the tip of the abdomen, moderately stout but tapering very regularly, unarmed above, the inferior genicular lobes produced but apically rounded, marked at base with a transverse dark bar; spined margins of hind tibiae smooth, scarcely dilated toward the tip, provided on outer margin with nine to thirteen, generally eleven, spines, the larger number being more common in the female. Subgenital plate of male short, transverse, of subequal width throughout, more or less tumid, the lateral margins ampliate at the base; anal cerci of male long, laminate, subclepsydral in shape, incurved; edges of inferior valve of ovipositor smooth.

This genus bears a close general resemblance to the gerontogeic genus *Oxya*, but differs strikingly from it in the separated metasternal lobes of the female, the blunt tips of the inferior genicular lobes of the hind femora, the smooth edges of the hind tibiae and the absence of the terminal spine of the outer series of the same. It is very narrowly separable from *Melanoplus*, and I do not see how it could be distinguished from it if we include in it, as Stål did, his *Pezotettix plebejus* and *rusticus*. The combination of such peculiarities as the long antennae and strongly transverse subgenital plate of the male with the long and parallel-sided pronotum of both sexes serves to distinguish it from *Melanoplus*, as here limited; while the strongly banded sides of the body and the long and clepsydral cerci of the male in all the species mark it as a peculiar type even if these markings and form of genitalia do occur in certain species of the diversified genus *Melanoplus*.

Three species are known and appear to be confined almost entirely to our Atlantic and Gulf borders, though some of the species occur as far inland as Indiana, Ohio, and Michigan. It is unknown west of the Mississippi, except in Louisiana and Texas (though Professor Bruner suspects its presence in Nebraska). They inhabit moist places.

The type is *P. floridana*.

ANALYTICAL KEY TO THE SPECIES OF PAROXYA.

A¹. Antennae and cerci of male relatively short; furcula of male consisting of a pair of triangular plates; tegmina at least as long as body..... 1. *atlantica* (p. 382).

A². Antennae and cerci of male relatively long; furcula of male consisting of a pair of subequal fingers; tegmina variable.

b¹. Furcula coarse, heavy, and depressed, generally straight; supraanal plate short triangular; tegmina much shorter than body 2. *hoosieri* (p. 382).

b². Furcula relatively slender, cylindrical, often divergent; supraanal plate long triangular; tegmina normally as long as body but very variable. 3. *floridana* (p. 383).

1. PAROXYA ATLANTICA.

(Plate XXV, fig. 8.)

Paroxya atlantica SCUDDER! (pars), Proc. Bost. Soc. Nat. Hist., XIX (1877), pp. 29, 88; (pars), Ent. Notes VI (1878), pp. 7, 29; (pars), Cent. Orth. (1879), pp. 46-47.

Dark wood-brown above, luteo-testaceous below, with a broad black stripe on the sides of the head behind the eye and the upper half of the lateral lobes of the pronotum, sometimes not affecting the metazona; antennae ferruginous, uniform or sometimes slightly infuscated apically, in the male slightly less than half as long as the body. Tegmina uniform brownish fuscous, just about as long as the body in both sexes. Hind femora luteo-testaceous, the upper inner surface with fuscous median and postmedian bars, the geniculations black, the hind tibiae pale glaucous, with ten to thirteen (usually as many as twelve) spines in the outer row. Supraanal plate of male very short triangular, with a short basal median sulcus with low walls; furcula consisting of a pair of flattened short triangular plates, whose adjacent inner walls are slightly elevated, but which diverge apically; cerci much shorter than in the other species, not extending beyond the tip of the supraanal plate, compressed laminate, strongly incurved, tapering rapidly at base, then subequal for a short space, ending in a spatulate tip nearly as broad as the base, well rounded apically.

Length of body, male, 23 mm., female, 29 mm.; antennae, male and female, 11 mm.; tegmina, male, 17 mm., female, 18 mm.; hind femora, male, 13 mm., female, 15.5 mm.

Nine males, 4 females. Georgia, H. K. Morrison (U.S.N.M.—Riley collection; S. H. Scudder); Fort Reed, Orange County, Florida, April 7, 21, 23, J. H. Comstock; Sandford, Orange County, Florida, G. B. Frazer.

2. PAROXYA HOOSIERI.

(Plate XXV, fig. 9.)

Pezotettix hoosieri BLATCHLEY!, Can. Ent., XXIV (1892), pp. 31-33.

Paroxya atlantica BLATCHLEY!, Can. Ent., XXV (1893), p. 90; Proc. Ind. Acad. Sc., 1892 (1894), p. 118; Can. Ent., XXVI (1894), p. 244.

Dark wood brown with an olivaceous tinge above, varying from flavous to clay yellow beneath, with a broad piceous stripe on the sides, occupying the upper half of the lateral lobes of the pronotum, in the female often fading out on the posterior part of the metazona. Face of the color of the under surface, but generally more or less obscured with fuscous or fuliginous; antennae uniform ferrugineo-testaceous, in the male much more than half as long as the body. Tegmina uniform olivaceous brown, less than twice as long as the pronotum. Legs bright olive green, the hind femora more or less embrowned, especially above. the geniculation black; hind tibiae pale glaucous, more or less luteous

basally with a narrow post-basal black annulus in the luteous portion, the spines black excepting at extreme base, ten to eleven in number in the outer series. Supraanal plate of male short triangular, mesially tectate, with a very slender, deep, percurrent sulcus broadening considerably at the apex; furecula consisting of a pair of adjacent, parallel, pretty long and coarse, strongly depressed, somewhat tapering, blunt apophyses; cerci compressed laminate, strongly incurved throughout, tapering to as much as half the basal width in the proximal half and then immediately and as regularly widening to nearly the basal width in the distal half, subtruncate apically.

Length of body, male, 20 mm., female, 29 mm.; antennae, male, 12 mm., female, 12.5 mm.; tegmina, male, 9.25 mm., female, 10.5 mm.; hind femora, male, 12 mm., female, 16 mm.

Ten males, 8 females. Vigo County, Indiana (W. S. Blatchley; A. P. Morse); Oberlin, Lorain County, Ohio, September 21, coll. L. Jones, W. S. Blatchley. Mr. Blatchley has also taken it in a tamarack swamp in Fulton County, Indiana, and says it is found abundantly from August to October. It was found around the margins of a pond in Vigo County and in Ohio in a swamp in woods.

Mr. Lynds Jones writes me that it is "found in abundance in the rank vegetation which sprang up in a dry swamp surrounded by woods" in the vicinity of Oberlin, Ohio.

Mr. Blatchley¹ describes the colors of the living insect.

3. PAROXYA FLORIDANA.

(Plate XXV, fig. 10.)

Caloptenus floridianus THOMAS!, Bull. U. S. Geol. Surv. Terr., I, No. 2 (1874), p. 68.

Caloptenus floridianus GLOVER, Ill. N. A. Ent., Orth. (1874), pl. xvii, fig. 3.—THOMAS, Rep. U. S. Ent. Comm., I (1878), p. 42.—BRUNER, *ibid.*, III (1883), p. 60.

Parorya atlantica SCUDDER! (pars), Proc. Bost. Soc. Nat. Hist., XIX (1877), pp. 29, 88; (pars), Ent. Notes, VI (1878), pp. 7, 29; (pars), Cent. Orth. (1879), p. 46.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 61.—FERNALD, Orth. N. E. (1888), p. 34; Ann. Rep. Mass. Agric. Coll., XXV (1888), p. 118.—DAVIS, Ent. Amer., V (1889), p. 81.—SMITH, Cat. Ins. N. J. (1890), p. 412; Bull. N. J. Exp. St., K (1890), p. 41; *ibid.*, XC (1892), pp. 4, 31, fig. 4g, pl. i, 2 figs.—BRUNER, Publ. Nebr. Acad. Sc., III (1893), p. 27.—MORSE, Psyche, VI (1893), pp. 401-402; *ibid.*, VII (1894), p. 15.—GARMAN, Orth. Ky. (1894), pp. 3, 8.—BEUTENMÜLLER, Bull. Amer. Mus. Nat. Hist., VI (1894), p. 305, pl. viii, fig. 5.

Parorya recta SCUDDER!, Proc. Lost. Soc. Nat. Hist., XIX (1877), pp. 30, 88; Ent. Notes, VI (1878), pp. 8, 29; Cent. Orth. (1879), p. 47.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 61.—SMITH, Cat. Ins. N. J. (1890), p. 412; Bull. N. J. Exp. St., K (1890), p. 41; *ibid.*, XC (1892), pp. 4, 31, fig. 4h.

Pezotettix atlanticus STÅL, Bih. K. Sv. Vet.-Akad. Handl., V, No. 9 (1878), p. 12.

Pezotettix rectus STÅL, Bih. K. Sv. Vet.-Akad. Handl., V, No. 9 (1878), p. 12.

Parorya floridana SMITH, Cat. Ins. N. J. (1890), p. 412.—BEUTENMÜLLER, Bull. Amer. Mus. Nat. Hist., VI (1894), p. 305.

Olivaceous, excepting top of head, thorax, and tegmina, which vary from light to dark brown. Head olivaceous yellow on face and sides,

¹ Can. Ent., XXIV, p. 32.

in the female more or less infuscated; above the antennæ brownish fuscous, more or less tinged with castaneous; behind the eyes a broad, straight, horizontal, black band, edged more or less distinctly, both above and below, with yellowish; antennae varying in length, being relatively longer in southern than in northern examples, but generally about two-thirds as long as the body in the male, yellow at base, beyond testaceous, deepening into fuscous toward the tip, the apices of the joints normally pallid. Upper surface of the pronotum of the color of the top of the head, the upper half of the deflected lobes with a very broad black band in continuation of that on the head, anteriorly edged more or less distinctly, both above and below, with yellowish and generally fading out before, or abruptly terminating at, the metazona (in the earlier stages it continues uninterruptedly across the pronotum, and this persistence is occasionally shown in the adult, or is indicated on the metazona by a brown band sometimes percurrent and usually reduced in width); pleura with a horizontal stigmatal stripe running backward from the hinder edge of the mesothoracic episterna (sometimes confined to the mesothoracic epimera), and an oblique stripe nearly following the division line between the metathoracic episterna and epimera; when the lower stripe is complete it renders the metathoracic episterna conspicuous, especially in the male, on account of the cubeiform oblique yellow dash which lies between these two black stripes. Hind margin of pronotum less distinctly angulate—that is, more uniformly rounded—than in the other species, though the difference is but slight and sometimes disappears. Tegmina nearly uniform brownish fuscous, often with a faint line of small fleckings down the middle in the female. Legs of the color of the body, the middle and hind femora generally more or less infuscated on their outer face, the upper half of the genicular lobes of the latter black; hind tibiae glaucous with black or blackish spines. Supraanal plate of male long triangular with a broad mesial rounded ridge extending two-thirds its length, on the summit of which, in the basal half of the plate, is a very narrow deep sulcus which, after interruption, is repeated again in the apical fourth; furcula consisting of a pair of moderately long, moderately slender, cylindrical, slightly tapering, blunt, adjacent fingers (shorter than usual in the specimen figured and drawn too stout), often divergent; cerci lamellate, very long, strongly incurved, gradually narrowing and then as gradually enlarging, so as to make the spatulate tip nearly as broad as the base, the apical margin rounded and submarginate.

The tegmina are ordinarily of about the length of the body, but, in the South particularly, it often occurs with tegmina only reaching a little beyond the middle of the abdomen. I have seen one such from Massachusetts; and in a pair from Fort Worth, Texas, in the National Museum the tegmina are scarcely longer than the pronotum and subacuminate at tip. This form may receive the racial name *texana*.

Length of body (in larger specimens), male, 29 mm., female, 41 mm.; antennae, male, 19 mm., female, 15.5 mm.; tegmina, male, 18 mm., female, 25.25 mm.; hind femora, male, 15.5 mm., female, 21 mm. The average length of New England specimens is: Male, 21 mm.; female, 31.

One hundred and thirteen males, 87 females. Michigan, M. Miles; Cambridge, Massachusetts, Boll (Museum Comparative Zoology); Faneuil Station, Boston, Massachusetts, July 22, 26, August 11 (A. P. Morse); Newtonville, Middlesex County, Massachusetts, August 11 (A. P. Morse); Niantic, New London County, Connecticut, August 8 (A. P. Morse); New Haven, Connecticut, S. I. Smith; North Haven, New Haven County, Connecticut, August 23 (A. P. Morse); Deep River, Middlesex County, Connecticut, August 24 (A. P. Morse); Stamford, Fairfield County, Connecticut, August 13-17, 24 (A. P. Morse); Staten Island, New York, July 25; Newark, Essex County, New Jersey, September 13, C. G. Rockwood (U.S.N.M.—Riley collection); Middle States, Baron Osten Sacken; Washington, D. C., July 27, August 23, 28, September 6 (U.S.N.M.—Riley collection); Virginia, September 10, October 19 (same); Diego Bluff, North Carolina, November 5, C. J. Maynard; Charleston, South Carolina, August; Georgia, A. Oemler, H. K. Morrison; Florida (U.S.N.M.—Riley collection); Enterprise, Volusia County, Florida, May 15, E. A. Schwarz; Fort Reed, Orange County, Florida, May 1, J. H. Comstock; Baton Rouge, Louisiana, September 7 (A. P. Morse); New Orleans, Louisiana, June 20, Shufeldt (U.S.N.M.—Riley collection); Dallas, Texas (same); Fort Worth, Tarrant County, Texas, May (same). Bruner reports it doubtfully from Nebraska.

Professor J. B. Smith found this insect injurious to cranberries in New Jersey.

Mr. A. P. Morse describes¹ a melanistic form. He found most of his New England specimens on *Spartina* and other grasses and sedges. It is found most abundant in wet localities.

26. POECILOTETTIX, new genus.

(Ποικίλος, mottled; τέττιξ, grasshopper.)

Head and body with the general aspect of *Melanoplus*. Head nearly vertical, especially in the female, the eyes moderately large, moderately prominent in the male, broad oval, not more than half as long again as broad; antennae very little longer in both sexes than head and pronotum together. Pronotum enlarging very slightly posteriorly, the suture between prozona and metazona deeply impressed, with rounded walls; the prozona scarcely or but little longer than the metazona, coarsely and distantly punctate, the transverse sutures distinct and rather heavy, transversely broadly convex with no lateral carinae; the

¹ Psyche, VI, pp. 401-402.

metazona finely and closely punctate, slightly tumid in the female, the angle of the lateral carinae well rounded, the posterior border broadly angulato-convex, margined; median carina obsolete or sub-obsolete throughout. Prosternal spine slender, straight, acuminate; meso- and metastethia together longer than broad; interval between mesothoracic lobes distinctly, generally very much, longer than broad, generally broader in the female than in the male, the metasternal lobes subattinent or approximate, the portion of the metasternum behind the lobes small, hardly more than twice as broad as long. Tegmina fully developed in all known species, remarkably uniform in width, with the costa very slightly expanded near the base, and a strongly and uniformly rounded apex. Hind femora moderately slender, with immaculate inferior genicular lobes, the tibiae with eight to nine external spines. Cerci of male extremely slender beyond the tapering laminate base, the furcula subobsolete; the lateral margins of the subgenital plate ampliate at base and the apex provided with a distinct tubercle; the pallium often has a pyramidal erection.

P. picticornis (Thomas) may be regarded as the type.

As far as known, this genus occurs only on the Pacific coast, near our southern borders. It is remarkable for the tuberculate abdomen, resembling *Hesperotettix*, but apical instead of subapical, and for the sometimes vivid and always exceptionally variegated colorings of its different species.

ANALYTICAL KEY TO THE SPECIES OF POECILOTETTIX.

- A¹. Antennae annulate and pronotum and femora distinctly and distantly punctate with blackish fuscous; antennae hardly attenuate apically; eyes of female anteriorly truncate; apical tubercle of male abdomen raised above the level of the sides of the subgenital plate 1. *picticornis* (p. 386).
 A². Antennae concolorous, distinctly attenuate apically; eyes of female anteriorly subtruncate; pronotum and femora variegated with red and brown; apical tubercle of male abdomen not elevated above the sides of the subgenital plate.
 b¹. Relatively stout-bodied, with stout femora; apex of male abdomen with a bifid tubercle 2. *sanguineus* (p. 387).
 b². Relatively slender-bodied, with slender femora; apex of male abdomen with a simple conical tubercle 3. *coccinatus* (p. 389).

I. POECILOTETTIX PICTICORNIS.

(Plate XXVI, fig. 1.)

Caloptenus (*Hesperotettix*) *picticornis* THOMAS!, Proc. Dav. Acad. Sc., II (1877), p. 125, pl. iv, figs. 1, 2.

Ground color very uniform luteo-testaceous, the pronotum and femora slightly darker than the tegmina and feebly lustrous. Head distantly and coarsely punctate with blackish brown along the carinae of the face, the front and inferior margins of the genae and across the labrum; pronotum similarly punctate, except upon the dorsum of the metazona (though the puncta follow the posterior margin), the puncta transversely disposed and in the center of the lateral lobes more or less

suffused and confluent, forming infumate spots; and similar puncta upon the thoracic pleura, all the femora, and the fore and middle tibiae; antennae coarse, bluntly terminated, annulate with blackish brown, which oddly occurs at the apex of one and the base of the succeeding joint, the incisures excepted; frontal costa slightly narrower than the interspace between the eyes, uniform in width, deeply sulcate; eyes of female anteriorly truncate, not more than half as long again as the anterior infraocular portion of the genae. Pronotum most sparsely pilose, the metazona with exceedingly delicate punctuation and with a very feeble median carina, continued on the prozona as an impressed line only; hind margin obtusangulate, the angle rather broadly rounded. Tegmina subhyaline on the apical half or more, both veins and cross-veins very pale testaceous; wings hyaline, nearly as long as the tegmina, of ample breadth, with pallid veins and cross veins. Hind tibiae and tarsi luteous, the spines black tipped, varying from eight to nine on the outer margin in both sexes. Supraanal plate of male triangular, rather elongate, with rounded acute apex, the surface with two high and sharp, subparallel, convergent and then divergent, longitudinal ridges, fading apically, including between them a rather narrow and very deep median sulcus extending the whole length of the plate, but shallow apically; furcula consisting of two distinct, not large, adjacent, rounded lobes, projecting by half their length; cerci moderately broad and slightly inflated at the base, at once narrowing, wholly on the upper side, beyond straight, compressed, equal, scarcely incurved, about one-third the width of the base, the tip roundly pointed, reaching as far as the tip of the supraanal plate; infracercal plates concealed when the cerci are recumbent; lateral margins of the subgenital plate sinuous, the apical tubercle a little elevated, broad, subtruncate, and subbid as viewed posteriorly, pilose.

Length of body, male, 19 mm., female, 28 mm.; antennae, male, 10 mm., female, 11.5 mm.; tegmina, male, 19.75 mm., female, 23.5 mm.; hind femora, male, 12.75 mm., female, 15 mm.

Two males, 2 females. Arizona, Dunn (L. Bruner; U.S.N.M.—Riley collection). It was originally described by Thomas from Arizona. Professor L. Bruner writes me that he has received the same species from Tepic, Jalisco, Mexico.

This insect may be instantly distinguished from every other in the entire group of Melanopli by its peculiar blackish punctuation and the annulate antennae. I had an opportunity of studying the type many years ago, and part of the above description is taken from notes made at the time.

2. POECILOTETTIX SANGUINEUS, new species.

(Plate XXVI, fig. 2.)

Dactylotum longipennis BRUNER, MS., fide TOWNSEND, Ins. Life, VI (1893), p. 30—undescribed.

Head bright yellow luteous, broadly clouded above and below and especially below with plumbeo-fuscous and somewhat irregularly enliv-

ened with crimson at various points, especially along the carinae, upon either side of the labrum, along the clypeal suture and the margins of the genae, besides a mediodorsal stripe on the vertex, and sometimes an oblique genal streak, and touches behind the eyes; eyes of female subtruncate anteriorly, the lower portion of their front with a distinct posterior curve; antennae rather slender, apically acuminate, dark fuscoplumbeous. Pronotum most sparsely pilose, light olivaceo-fuscous, the sulci marked with blackish fuscous, a mediodorsal crimson stripe, and crimson margining the lateral lobes of the metazona, broadly behind, narrowly beneath, besides touches in the center of an olivaceous patch in the upper part of the lateral lobes of the prozona and along the front margin of the same; metazona with crowded fine punctuation and a slight median carina, the hind margin obtusangulate, the angle rounded. Tegmina far surpassing the abdomen, rather slender, hyaline on much more than the distal half, the veins pea-green; wings nearly as long as the tegmina, with ample breadth, hyaline, the veins pale glaucous. Fore and middle femora yellow luteous, longitudinally and narrowly striped with fuscous; hind femora yellow luteous, the outer face and especially its lower half, excepting a pregenicular band, plumbeofuscous, the upper face crossed by four plumbeofuscous bands—a basal more or less obsolete, an apical covering the geniculation, and two between; hind tibiae and tarsi glaucous, the spines pallid glaucous with black tips, eight in number in both sexes. Abdomen olivaceo-fuscous above, bright yellow beneath, the lower margins of the dorsal plates and the dorsal carina marked with carmine; supraanal plate of male triangular with bluntly pointed apex, the surface with two rather distant, parallel, longitudinal, somewhat elevated but not very sharp ridges, extending over the basal two-thirds of the plate, inclosing between them a rather broad, subequal, moderately deep sulcus which does not continue to the apex; furcula consisting of two closely approximated, rounded, little projecting lobes lying over the sulcus; cerci moderately broad and laminate at base, rapidly tapering on basal half, largely by the excision of the upper margin, the apical half or more subcylindrical, very slender, equal, terminating bluntly, gently incurved; infracercal plates concealed by the recumbent cerci; lateral margins of the subgenital plate straight beyond the ampliate bases, the apical tubercle not elevated above its level, rather slight, bifid.

Length of body, male, 21 mm., female, 26 mm.; antennae, male, 8.75 mm., female, 9 mm.; tegmina, male, 18.25 mm., female, 24.5 mm.; hind femora, male, 10.5 mm., female, 13.5 mm.

One male, 1 female. Bradshaw Mountain, Arizona, June 21, A. B. Cordley (L. Bruner).

The bright coloring of this species recalls that of *Dactylotum*. Professor Bruner informs me that this was the species referred to by Townsend in *Insect Life* (VI, p. 30) as found at Hance's in the Grand Cañon of the Colorado, 3,000 to 5,000 feet below the rim. As all the

species of the present genus have similarly long wings, I have not retained the manuscript name of Bruner, given by him to distinguish it from the species of *Dactyloptum* which have short wings.

3. *POECILOTTIX COCCINATUS*, new species.

(Plate XXVI, fig. 3.)

Head brighter or duller yellow, more or less infumated, especially on the lower half, but enlivened with crimson more or less distinctly (but not so conspicuously) as in *P. sanguineus* and at somewhat similar points, but especially on the fastigium, the sides of the labrum, the clypeal suture, and the lateral carinae of the face, besides the medio-dorsal stripe of the vertex; eyes of female as in *P. sanguineus*; antennae apically acuminate, greenish plumbeous, the basal joints pale. Pronotum most sparingly pilose, olivaceo-fuscous with shades varying from olivaceous to fuscous, the latter more pronounced on the front part of the metazona and the dorsum of the prozona, except an olivaceous, continuous, mediodorsal stripe, more or less conspicuously marked with a crimson thread; crimson also margins the lateral lobes of the metazona and appears more or less distinctly on the upper half of the lateral lobes of the prozona; the transverse sulci of the disk are only slightly darker than the ground; metazona with crowded fine punctuation and a slight median carina, the hind margin strongly convex, hardly angulate. Tegmina slender, far surpassing the abdomen, hyaline on more than the apical half, the veins yellow; wings nearly as long as the tegmina, greenish hyaline, the veins of the upper half fuscous or greenish fuscous, of the lower half and most of the cross veins glaucous. Fore and middle femora luteous, clouded with fuscous; hind femora luteous, the outer face infuscated and the upper area alternately pale fuscous and luteous or carmine; hind tibiae and tarsi glaucous, the spines glaucous or pallid with black tips, seven to eight on the outer row in the female, eight in the male. Abdomen light fuscous with dull luteous areas, but no enlivenment with brighter colors; supraanal plate of male triangular, elongate, the apex acute; surface with two parallel, not distant, sharply elevated ridges which extend, diminishing posteriorly, nearly or quite the length of the plate, including between them a rather narrow and deep narrowing sulcus; furcula consisting of only a slight thickening of the posterior edge of the last dorsal segment above the two ridges of the supraanal plate; cerci not very broad at extreme base, rapidly and regularly tapering in the basal third, the remainder very slender, equal or barely expanded at the blunt extremity; lateral margins of the subgenital plate straight on the apical half, the apical tubercle not rising above their level but having the same direction, conical, simple.

Length of body, male, 20 mm., female, 30 mm.; antennae, male, 7.5 mm., female, 8 mm.; tegmina, male, 19 mm., female, 24.5 mm.; hind femora, male, 10 mm., female, 14 mm.

One male, 3 females. Los Angeles, California, Coquillett (U.S.N.M.—Riley collection).

This species closely resembles the preceding, but is rather slenderer, especially the male, with less pronounced crimson markings, besides the differences noted in the table.

27. OEDALEONOTUS, new genus.

(*Οἰδαλέος*, swollen; *νωτός*, back.)

Body stout, heavy and clumsy. Head large and full, the vertex well arched, raised considerably above the level of the prothorax, the fastigium broad, broadly and shallowly sulcate and considerably declivent, the eyes separated rather widely; face nearly vertical; frontal costa very broad, subequal, nearly plane, percurrent but sometimes obscure basally; eyes rather large, not very prominent, broadly ovate, with a slight production above anteriorly; antennae not slender, uniform, slightly longer (male) or slightly shorter (female) than head and pronotum together. Pronotum short and stout, enlarging posteriorly only by the slight flare of the metazona, with vertical though slightly tumid lateral lobes, more or less flaring on the metazona below, separated from the dorsum by more or less pronounced, coarse, rounded rugae, generally interrupted on the posterior portion of the prozona, the median carina interrupted between the sulci; disk of prozona distinctly tumid, but little longer than the metazona, from which it is separated by a very deep sulcus, its own posterior transverse sulci deeply impressed, approximate, and subparallel, the anterior submarginal sulcus also very distinct, the margin being elevated to receive the head; metazona plane, punctato-rugulose, very obtusely angulate behind, the border marginate. Prosternal spine short, conical, blunt; meso- and metastethia together distinctly longer than broad in both sexes, the mesosternal lobes a little longer than broad in both sexes, the metasternal lobes subattinent in the male, slightly distant in the female, the space behind the latter laterally elongate, extending forward to the coxae. Tegmina fully developed or abbreviate, rarely shorter than the pronotum and then but slightly. Hind femora stout, heavy, and tumid, the inferior genicular lobe pallid, immaculate. Abdomen of female with abbreviated terminal segments (recalling *Bradynotes*) and partially exerted ovipositor; of male not enlarged at the extremity and scarcely elevated, terminating roundly and bluntly, the last ventral segment (in advance of the subgenital plate) scarcely longer than the penultimate; subgenital plate of male very brief and subequal, its lateral margins distinctly ampliate at the base and entire apically, with no tubercle; cerci tumid and enlarged at base, suddenly contracted, and terminating in a slender posterior process.

This genus is quickly separated from those in its immediate vicinity by the tumidity of the prozona, and the clumsy form, which give it a very distinct appearance.

I know of but a single species, which inhabits the Pacific coast from Canada to Mexico, and which assumes three forms according to the length of the organs of flight, that with the organs fully developed being thus far known only from southern California, from the head of the San Joaquin Valley to San Diego. It is distinguished from the others not only by the development of these organs, but by a slightly slenderer body, the grossness of the others seeming to be correlated with their incapacity of flight.

OEDALEONOTUS ENIGMA.

(Plate XXVI, figs. 4-6.)

Melanoplus collaris SCUDDER!, Can. Ent., XII (1880), p. 75.

Melanoplus flavoannulatus BRUNER, Ins. Life, III (1890), p. 140.

Pezotettix enigma BRUNER, Bull. Div. Ent. U. S. Dep. Agric., XXVIII (1893), pp. 33-34, fig. 17.

OEDALEONOTUS ENIGMA COLLARIS.

(Plate XXVI, fig. 6.)

Melanoplus collaris SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1878), p. 286;

Ent. Notes, VI (1878), p. 45.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 60.

Caloptenus flavolineatus BRUNER (*nec* THOMAS), Bull. Div. Ent. U. S. Dep. Agric., XXVIII (1893), p. 33.

OEDALEONOTUS ENIGMA.

(Plate XXVI, fig. 5.)

Pezotettix enigma SCUDDER!, Ann. Rep. Chief Eng., 1876 (1876), p. 505; Ann. Rep.

Geol. Surv. 100th Mer., 1876 (1876), p. 285; Proc. Bost. Soc. Nat. Hist., XIX

(1878), p. 287; Ent. Notes, VI (1878), p. 46.—BRUNER, Rep. U. S. Ent. Comm.,

III (1883), p. 59; Can. Ent., XVII (1885), p. 15; Bull. Div. Ent. U. S. Dep.

Agric., XXVII (1892), p. 29.

OEDALEONOTUS ENIGMA JUCUNDUS.

(Plate XXVI, fig. 4.)

Pezotettix jucundus SCUDDER!, Ann. Rep. Chief Eng., 1876 (1876), p. 505; Ann.

Rep. Geol. Surv. 100th Mer., 1876 (1876), p. 285.—BRUNER, Rep. U. S. Ent.

Comm., III (1883), p. 59.

Body yellowish testaceous marked with brownish fuscous. Head above, behind the narrowest part of the vertex, marked with an elongated, expanding, blackish fuscous stripe, through the middle of which runs a yellow line, and by a supraorbital arcuate band of a similar color, usually broken, often obsolete, and terminating just below a narrow short yellow stripe behind the upper part of the eye; space between the eyes rather narrower than the frontal costa, the fastigium broadening considerably in front of the eyes and broadly sulcate throughout; frontal costa broad and nearly equal, broadest just above the ocellus, rather sparsely punctate, and at the ocellus very shallowly sulcate, often nearly imperceptible. Pronotum short and rather stout,

the anterior and posterior halves of the lateral lobes nearly symmetrical; disk obscured with fuscous or dark brown, with equal sides; the median carina, which is marked with dark brown and is distinct though slight on the metazona, is obsolete on the prozona, represented only by the dark line, sometimes faintly impressed; lateral carinae very obscure, converging anteriorly, and distinguished by a narrow, dull yellow stripe, the rest of the disk and the upper part of the lateral lobes being obscurely marked with dusky brown, which on the lateral lobes is darkest in the sulci; a distinct longitudinal sulcus, more distinct for its deeper color, unites the two percurrent sulci of the lateral lobes in the middle; anterior margin of the prozona marked by a submarginal continuous sulcus, distinct only on the lateral lobes; posterior border of the metazona very broadly rounded or subangulate. Prosternal spine straight, rather slender, subconical, bluntly pointed. Tegmina subovate, slightly longer than the pronotum in the form *jucundus*, fully half as long as the abdomen in the form *enigma*, fully as long as and generally much longer than the abdomen in the form *collaris*, brownish fuscous, the longitudinal veins mostly yellowish, and flecked, principally along the median area but also without it, with longitudinal series of subquadrate, blackish fuscous spots, the apex subacuminate when abbreviate, well rounded when fully developed; wings pellucid with fuscous veins. Pleura with an oblique, bright yellow stripe, edged with black above the hind coxae. Hind femora luteous, the outer and in part the upper face marked by a large, apical, yellowish-brown spot, a very broad, angulate, transverse median band of the same color, and a similar basal band, sometimes obsolete or obsolescent, on the lower half; outer arc of upper genicular lobes black; tibiae glaucous, yellow on the sides and at extreme base, the apical half of the spines black; arolium either quadrate, rather narrow, longer than the claws (male) or obpyriform, small, but little more than half as long as the claws (female). Abdomen yellow, the sides chafed by the femora dark fuscous; supraanal plate of male rather short triangular, the sides feebly sinuate, the apex acute, the surface marked by a pair of deep and broad converging sulci, lying between the lateral margins and the thereto parallel, elevated and rather sharp ridges, which inclose a deep, triangular, basal sulcus; a slender delicate median sulcus on apical half; cerci very broadly expanded and bullate at the base, tapering rapidly and regularly just beyond the middle, beyond less rapidly, forming a delicate, slender, but bluntly pointed tip, slightly hooked downward and feebly incurved.

Length of body, male, 25 mm., female, 24 mm.; antennae, male and female, 8.5 mm.; tegmina, male, 21.5 mm., female, 23 mm.; hind femora, male, 14 mm., female, 16 mm. These measurements are taken from the form *collaris*.

Seventy-one males, 78 females. Boise City, Ada County, Idaho (U.S. N.M.); Washington, Morrison (U.S.N.M.; S. Henshaw) La Chapples, Yakima County, Washington, July 16 (Museum Comparative Zoology);

Lone Tree, Yakima River, Washington, July 18 (same); Spokane, Washington, July 21-22 (same); Loon Lake, Colville Valley, Washington, July 25 (same); Umatilla, Oregon, June 24, 27 (same); The Dalles, Wasco County, Oregon, H. Edwards; The Dalles, Oregon, June 23, Henshaw (Museum Comparative Zoology); California, Burrison (S. Henshaw): Fort Reading, Shasta Valley, California, Lieutenant Williamson; Walker Basin, Siskiyou County, California, July 15, A. K. Fisher (U.S.N.M.); Tehama County, California, Coquillett (same); Agua Caliente, Sonoma County, California, E. Palmer; Sacramento County, California, Coquillett (U.S.N.M.); Atwater, Merced County, California, July 29, Coquillett (same); Tipton, Tulare County, California Crotch (Museum Comparative Zoology; S. H. Scudder); Santa Barbara, California, July 1, H. W. Henshaw, C. J. Shoemaker; San Buenaventura, Santa Barbara County, California, August 18 (U.S.N.M.); Mohave River, California, O. Loew; Los Angeles, California, July, C. J. Shoemaker; Los Angeles County, California, May, June, and *in coitu* September, Coquillett (U.S.N.M.); Los Angeles, California (L. Bruner); San Bernardino County, California, May, *in coitu* (U.S.N.M.); San Diego County, California (E. Palmer; U.S.N.M.); Tighes Station, San Diego County, California, E. Palmer.

Bruner reports the species also from Nevada and Arizona.

Palmer found this species on grassy slopes, beside brooks.

The form *enigma* appears to be the only one found in the northern part of the range of the species north of central California, and the form *collaris* is rarely met with anywhere.

The different forms have not been taken *in coitu* with each other, so far as I know. The form *jucundus* besides having very short tegmina, is noticeably smaller than the others.

I can scarcely think the form *collaris* to be the insect described by Thomas as *Calcoptenus* [sic] *flavolineatus*,¹ as Bruner has supposed. Thomas's description very poorly fits it; he makes no mention of the tumid prozona, and he states, both here and subsequently,² that it closely resembles *Melanoplus spretus*, and that the posterior margin of the subgenital plate of the male is notched, whereas its general appearance is very different indeed from *M. spretus*; so much so that it can hardly be believed that anyone would select it for comparison; nor has the apical margin of the subgenital plate the faintest sign of any emargination. Thomas's specimen was derived from Crotch's collection in the Museum of Comparative Zoology; Crotch collected *Oedaleonotus enigma collaris* in central, not southern, California, whereas Thomas gave his *C. flavolineatus* from southern California. Thomas's description does not at all fit any species from southern California which has come under my notice, and until such a form occurs his name should go for nothing—at least until the Acridian fauna of that region is fairly well known.

¹ Bull. U. S. Geol. Surv. Terr., I, No. 2, p. 68.

² Rep. U. S. Ent. Comm., I, p. 43.

28. ASEMOPLUS, new genus.

(*ἄσμημος*, without device; *ὄπλα*, armor.)

Body resembling *Conalcaea* in general appearance, rather slender, compressed cylindrical, feebly and sparsely pilose. Head moderately large, not prominent, with feebly tumescent genae, the vertex well arched, raised but little above the general level of the pronotum, the fastigium rapidly descending, the face rounded and a little retreating; eyes separated widely, the fastigium depressed only between them and very feebly, passing insensibly into the broad and equal frontal costa, which is yet narrower than the interspace between the eyes, rounded, fading below the ocellus. Eyes large, moderately prominent, very broad oval, the front border subtruncate, half as long again as the anterior infraocular portion of the genae; antennae very slender, longer than the head and pronotum together. Pronotum short, subequal, the metazona flaring somewhat, transversely convex, the disk passing insensibly into the subvertical lateral lobes, with no sign of lateral carinae, the median carina slight and occurring only on the metazona; fore and hind margins both truncate, the latter feebly and broadly emarginate; prozona coarsely and sparsely punctate, transverse, almost twice as long as the finely and densely punctate metazona, the transverse sulci of the former distinct, the postmedian more or less sinuate. Prosternal spine erect, stout, subconical; meso- and metastethia together distinctly (male) or slightly (female) longer than broad, the interval between the mesosternal lobes quadrate (male) or transverse and as broad as the lobes (female); metasternal lobes rather (male) or distinctly (female) distant, but in neither case more distant than the width of the frontal costa, the portion of the thorax behind the metasternal lobes only a little more than half as broad as the metasternum, but more than twice as broad as long. Tegmina linear, lateral, shorter than the pronotum. Hind femora not very long, but slender, the inferior genicular lobe pallid and immaculate, the hind tibiae with ten to twelve spines in the outer series. Abdomen of male feebly clavate apically and somewhat upturned, the lateral margins of the subgenital plate strongly ampliate at base, apically produced and acutangulate, but with no tubercle; cerci substyliform; abdomen of female tapering regularly to a pointed tip, the ovipositor normally exerted.

This genus is represented by a single species, found only in the extreme northwestern United States.

ASEMOPLUS MONTANUS.

(Plate XXVI, fig. 7.)

Braconnotes montanus BRUNER!, Can. Ent., XVII (1885), pp. 16-17.

Body very dark reddish brown, marked with black and testaceous, beneath luteous. Head olivaceo-luteous, infumated, above and on the

posterior parts of the genae above the lower level of the eyes dark reddish brown, with a mediodorsal thread of testaceous, and another behind the middle of the upper half of the eyes; whole face and especially frontal costa punctate; antennae ferruginous, apically infuscated. Pronotum with the metazona ferrugineo-testaceous, the prozona very dark reddish brown, the upper two-thirds of the lateral lobes piceous or plumbeo-piceous, sometimes merely dull piceous, with black sulci, the lower portion of the lobes including the metazona luteous, fading upward gradually on the metazona. Mesonotum, metanotum, and abdomen dark reddish brown, with a sometimes obsolete, slender, flavo-testaceous or ferrugineo-testaceous dorsal stripe edged with black, which in some cases reappears on the prozona of the pronotum. Tegmina about as long as the prozona,¹ subequal, three or four times as long as broad and well rounded at tip, fusco-testaceous, lighter along the inner (upper) margin. Legs luteous, more or less heavily tinged with ferruginous along the upper surface, the hind femora more than the anterior pairs, the carinae being often more or less heavily marked with black, the genicular arc black; hind tibiae very feebly incurved, yellow luteous, the spines black-tipped. Supraanal plate of male triangular with slightly rounded sides, the tip well rounded, with a deep basal median sulcus, half as long as the plate and bounded by rather high ridges, which after uniting in the middle again part slightly and run parallel to the apex, leaving a slight sulcus between them; furcula consisting of a pair of slightly separated minute triangular lobes; cerci slender, slightly compressed, tapering gently on basal half, beyond very slender, subcylindrical, scarcely tapering, acuminate, and curved downward (the latter feature not shown in the figure); infracereal plates rather short, rounded, concealed by the recumbent cerci.

Length of body, male, 17 mm., female 19.5 mm.; antennae, male, 6.75 mm., female, 6 mm.; tegmina, male and female, 3 mm.; hind femora, male, 8.75 mm., female, 10 mm.

Seven males, 7 females. Montana, L. Bruner (L. Bruner; S. H. Scudder; U.S.N.M.—Riley collection); Loon Lake, Colville Valley, northeastern Washington, July 23–25, S. Henshaw (Museum Comparative Zoology).

Bruner states that the Montana specimens were taken near Helena "among the trailing junipers on north mountain slopes, at moderate elevations." He also states that the colors of the living insect are much more vivid than in cabinet specimens. "The yellowish hair-lines and dorsal line of the abdomen are glossy white, while the front and lower surface are of a bright lemon yellow; the brown is a bright hazel."

In some specimens, especially of the female, the pronotum is crossed by a narrow testaceous stripe which cuts the darker markings, running

¹Bruner states that the tegmina are sometimes absent, but I think only from individuals that have lost them by accident. I have seen only one in which they were lost from both sides; several in which they have been lost from one side.

obliquely upward from the lower level of the eye toward the upper posterior limit of the lateral lobes of the prozona, usually narrowing as it goes.

29. PHILOCLEON, new genus.

(*Φιλοκλέων*, a character in Aristophanes "Wasps," who ends the play in a leaping dance.¹)

Body closely resembling that of *Podisma*, compressed cylindrical, not very slender, rather thinly pilose throughout with rather long delicate hairs. Head moderately large, feebly prominent, the genae not tumescent, the vertex well arched but only slightly elevated above the pronotum; fastigium sulcate and declivent, passing insensibly into the straight and little prominent frontal costa, the face retreating but little; eyes rather widely separated, moderate in size, rather prominent, broad oval, the front margin subtruncate (female) or feebly convex (male), not more than half as long again as broad, produced neither above nor below; antennae slender, much longer than (male) or as long as (female) the head and pronotum together. Pronotum short, compressed cylindrical, with no trace of lateral carinae and a very feeble median carina, both front and hind margins truncate; prozona sparsely and feebly, metazona more closely but not densely punctate, the transverse sulci moderate. Prosternal spine short, conical; meso- and metastethia together much longer than broad in both sexes, the latter narrowing rapidly behind, so that the portion behind the lobes is only (male) or scarcely more than (female) half as broad as the metastethium; interspace between the mesosternal lobes longer than broad (male) or subquadrate (female), the metasternal lobes attingent or subattingent (male) or approximate, the interspace narrower than the frontal costa (female). Tegmina wanting. Hind femora moderately stout, the inferior genicular lobe pallid except at extreme base, the hind tibiae with nine to eleven spines in the outer series. Sides of the first abdominal segment with no tympanum, the extremity in the male clavate, the subgenital plate with no apical tubercle, its lateral margins abruptly and considerably ampliate at the base; cerci lamellate, narrow beyond the rather broad base and incurved. Abdomen of female regularly tapering, the ovipositor normally exerted.

The genus is represented by a single Mexican species, originally described as *Pezotettix nigrovittatus* Stål.

PHILOCLEON NIGROVITTATUS.

(Plate XXVI, figs. 8, 9.)

Pezotettix nigrovittatus STÅL, Bih. K. Sv. Vet.-Akad. Handl., III, No. 14 (1875), p. 32; *ibid*, V, No. 9 (1878), p. 15.

Pezotettix apterus BRUNER!, MS.

Flavo-testaceous, heavily variegated with black and red, pilose. Head fusco-olivaceous, darker in the male than in the female, above

¹ "For now in these sinewy joints of ours
The cup-like socket is twirled about."

with a median black stripe and a broad postocular piceous band broadly margined with flavo-testaceous; vertex well arched, slightly or not elevated above the pronotum, the interspace between the eyes a little broader than (male) or fully twice as broad as (female) the first antennal joint; fastigium considerably declivent, rather deeply sulcate; frontal costa almost percurrent, equal, about as broad as (male) or distinctly narrower than (female) the interspace between the eyes, strongly sulcate throughout, sparsely punctate; eyes moderate in size, prominent particularly in the male, much longer than the infraocular portion of the genae; antennae pale red, feebly infuscated apically, fully four-fifths (male) or about two-thirds (female) as long as the hind femora. Pronotum short, subcylindrical, a little compressed, in the female feebly and regularly enlarging posteriorly, in the male equal on the prozona and faintly flaring on the metazona, the disk in both sexes transversely convex and passing quite insensibly into the vertical lateral lobes; the ground color of the pronotum is flavo-testaceous, but it is heavily overlaid with black somewhat irregularly, which however forms a broad dorsal band (divided in the female by a mediodorsal flavous stripe) crossing the prozona only, and very broad piceous (male) or brownish fuscous (female) postocular bands crossing the whole pronotum, broken to some extent, and especially posteriorly divided by a flavo-testaceous, posteriorly flavous, longitudinal stripe running through its upper portion; the transverse sulci are also marked in black and the lower margins of the lobes are broadly bordered with blackish fuscous; the disk of the metazona is ferruginous or rufous, more or less infuscated laterally; median carina obsolete; front margin truncate (male) or gently and mesially arcuate (female), hind margin truncate; prozona very sparsely punctate, subquadrate, only a third longer (the principal sulcus arcuate, opening backward) than the finely punctate metazona. Prosternal spine short, conical, blunt; interspace between mesosternal lobes half as long again as broad (male) or a little broader than long (female). Tegmina wanting. Fore and middle femora considerably swollen in the male, ferrugineo-flavous; hind femora varying from flavo-testaceous to ferruginous and very broadly bifasciate with black, the fasciations so confused on the outer face, especially in the female, that this often becomes wholly black with more or less pronounced flavous incisures, the lower margin of the outer face flavous, sometimes linearly dotted with black, the lower face more or less sanguineous, the sides of the geniculation black except the flavous apical portion of the lower genicular lobe; hind tibiae more or less feebly incurved apically, fusco-glaucous with a black patellar annulus, the spines black in their apical half, ten, rarely nine or eleven, in number in the outer series. Abdomen with meso- and metathorax dull flavo-testaceous, heavily overlaid with black in more or less broken continuation of the pronotal stripes and bands, the slender mediodorsal flavous stripe of the prozona also repeated on the

abdomen in the female; the extremity strongly clavate in the male and considerably recurved, the supraanal plate triangular with blunt apex, the sides nearly straight, feebly emarginate just before the middle, but scarcely at all elevated, the median carina very deep in the basal half between high and sharp walls, beyond shallow and feeble but percurrent; furcula consisting of a pair of approximate, minute, slender, parallel, blunt fingers, no longer than the last dorsal segment; cerci very long and slender, exteriorly a little tumid, bent arcuate, tapering gradually to the middle to less than half the basal breadth, then bent roundly inward and thereafter equal, blunt-tipped, their tips meeting over the apex of the supraanal plate; subgenital plate short, slightly broader apically than at base, almost twice as long as broad, the lateral margins strongly rounded at base, with the apical margin, as seen from above, very strongly rounded, not elevated, entire.

Length of body, male, 18 mm., female, 22 mm.; antennae, male, 8.75 mm., female, 8 mm.; pronotum, male, 4.2 mm., female, 5.25 mm.; hind femora, male, 10.5 mm., female, 12.5 mm.

Two males, 4 females. Comancho, Zacatecas, Mexico (L. Bruner); San Luis Potosi, Mexico, E. Palmer; Mount Alvarez, San Luis Potosi, Mexico, E. Palmer.

By the kindness of Doctor Aurivillius of Stockholm, I am able to illustrate the male abdomen of Stål's type (fig. 9), which I should have been unable to identify with certainty from the rather meager description. I do not find the apex of the hind tibiae black, as Stål states them to be.

30. APTENOPEDES.

(*Ἀπτήνη*, unfledged; *πηδάω*, to leap.)

Aptenopedes SCÜDDER, Proc. Bost. Soc. Nat. Hist., XIX (1877), pp. 83-84.

Body compressed, especially in the female, where it is also feebly fusiform, feebly pilose. Head projecting, front strongly oblique, whole summit of head horizontal, scarcely convex, triangular; eyes nearly meeting above, especially in the male, where they are separated by a space not wider than the narrowest part of the frontal costa, the fastigium in front of them laterally expanded and slightly tumid; front subappressed, particularly in the female, almost straight; eyes long oval, moderately prominent, in the female depressed and tapering above; antennae moderately slender, linear, subdepressed, about as long as (female) or slightly longer than (male) the head and pronotum together; palpi rather small, the last joint nearly cylindrical, not in the least expanded. Pronotum regularly expanding posteriorly in the female, only expanding at the very tip and then but slightly in the male; front margin slightly convex, hind margin slightly and angularly excised: surface uniformly rugulose, tectiform, especially in the female, the median carina distinct but not prominent, the lateral carinae wholly

wanting; metazona less than half as long as the prozona, the latter divided a little behind the middle by a scarcely perceptible sinuate sulcus; lateral lobes nearly twice as long as broad, narrowing downward, the inferior margin very broadly angulate, the posterior margin roundly excised. Prosternal spine blunt, conico-cylindrical; inner margin of mesosternal lobes broadly convex, the lobes subapproximate (male) or distant from each other by half their width (female); metasternal lobes subcontiguous in both sexes. Tegmina linear, about as long as the pronotum, or absent. Hind femora extending nearly to (female) or a little beyond (male) the tip of the abdomen, the superior margin unarmed, the hind tibiae with their outer edges smooth, the spines similar in length on the two sides, those of the outer series nine to ten in number; first and third tarsal joints equal, the second less than half as long as either. Abdomen indistinctly carinate throughout, the extremity scarcely enlarged in the male; subgenital plate ampliate at base, short, not projecting far beyond the tip of the small supraanal plate, and in particular so little elevated posteriorly as to expose the recumbent pallium more or less to a posterior view; furcula feeble; cerci styliform; infracercal plates highly developed.

In general appearance the species of this genus most nearly resemble those of *Gymnoscirtetes* Bruner, *Paradichroplus* Bruner, and *Scopas* Giglio Tos. The distinctions of the genus from the first, besides its ampliate subgenital plate, are pointed out under that genus. From *Paradichroplus* it differs in its more compressed body, the more tapering vertex, the slenderer tegmina (when they are present), the lack of any enlargement of the tip of the male abdomen, with the shorter subgenital plate, the ampliate basal margin of the same, the posteriorly exposed pallium, and the wholly simple cerci. From *Scopas*, which I have not seen, it appears to differ in its more prominent prosternal spine, its narrower labrum, more declivent face, less cylindrical pronotum, with its excised posterior margin, besides its simple cerci. Its subconical head, especially in the female, gives it a peculiar aspect.

A. sphenarioides Scudder, is the type.

Three species occur in the Southern States along the borders of the Gulf of Mexico, and may be separated as follows:

ANALYTICAL KEY TO THE SPECIES OF APTENOPEDES.

- A¹. Tegmina present in one or both sexes; frontal costa no broader at base than in the middle.
- b¹. Tegmina present in both sexes; furcula of male as long as the last dorsal segment; anal cerci tapering only on basal half..... 1. *sphenarioides* (p. 400).
- b². Tegmina present in female only; furcula of male not more than half as long as the last dorsal segment; anal cerci tapering almost uniformly throughout..... 2. *rufovittata* (p. 401).
- A². Tegmina present in neither sex; frontal costa much broader at base than in middle, at least in the male 3. *aptera* (p. 402).

I. APTENOPEDES SPHENARIOIDES.

(Plate XXVI, fig. 10.)

Aptenopedes sphenarioides SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1877), pp. 84-85; Ent. Notes, VI (1878), p. 25.—BRUNER, Rep. U. S. Ent. Comm. III (1883), p. 55.

Body green, the upper surface a little infuscated in the male. Head and whole front flecked with fuscous or blackish puncta; antennae with the first two joints pale or greenish, beyond growing testaceous, the apical third blackish fuscous. Pronotum uniformly dull rugulose, more obscurely on the lateral lobes than above, and furnished with very scattered, inconspicuous, delicate, short, white hairs found also on the head, and with a white or very pale pink, straight lateral stripe, running from the upper posterior border of the eye to the hinder edge of the pronotum; this stripe is bordered more (male) or less (female) distinctly with black beneath; lower edges of lateral lobes a little pale, especially in the male. Prosternal spine terminating bluntly. Tegmina reaching the end of the first abdominal segment, white above, black below, in continuation of the lateral stripe. Metapleura more or less distinctly striped with black and white in imitation of the tegmina. Hind femora green exteriorly, more or less infuscated in the female, especially above, the upper carina of the outer face obscurely marked with black, the outer half of the upper face more or less distinctly testaceous in the male; hind tibiae green with a plumbeous tinge, the spines black tipped. Abdomen obscurely punctate on the basal half with small, indistinct, laterodorsal spots of mingled white and blue black dots on the posterior extremity of the segments, which in the male lie at the outer limit of a broad dorsal testaceous stripe, which is bordered externally with blackish and so obscures the spots; supraanal plate of male slender, elongate, equal as far as the middle, beyond subtriangular, acutangulate at tip, the margins elevated, with a slender, sharp, median sulcus, bordered basally by slight ridges; furcula consisting of a pair of subattingent, parallel, blunt, cylindrical processes, extending but a short distance over the plate; cerci rather small, laminate, tapering rapidly in the basal half, beyond equal and slender, but at tip acuminate by the excision of the upper margin, the whole feebly incurved; infracercal plates large, broad apically, extending slightly beyond the supraanal plate and very broadly rounded at tip.

Length of body, male, 17 mm., female, 25 mm.; antennae, male and female, 7 mm.; tegmina, male, 3 mm., female, 4 mm.; hind femora, male, 10 mm., female, 11.25 mm.

Three males, 5 females. Fort Reed, Orange County, Florida, April 8-28, J. H. Comstock; Jacksonville, Duval County, Florida, April, C. J. Maynard; The same, August, W. H. Ashmead (U.S.N.M.); Key West, Florida, C. J. Maynard; Biscayne Bay, Dade County, Florida, E. Palmer.

2. APTENOPEDES RUFOVITTATA.

(Plate XXVI, fig. 11.)

Aptenopedes rufovittata SCUDDER!, Proc. Bost. Soc. Nat. Hist., XIX (1877), pp. 85-86; Ent. Notes, VI (1878), p. 26.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 55.

Body green, more or less infuscated above. Face minutely and rather sparsely dotted with blackish fuscous, the mouth-parts and the lower part of the face often decidedly pink; antennae with the first two joints green, beyond either dull green more or less infuscated (male) or with the basal half reddish or pinkish brown and the apical half olivaceous-fuscous (female); eyes as in *A. sphenarioides*. Pronotum rugulose, much more heavily in the male than in the female, and the dorsum of the other thoracic joints and the basal abdominal joints similarly marked; pronotum with a distinct (female) or inconspicuous (male) median carina, obscurely infuscated in the male, generally marked distinctly but narrowly with testaceous in the female, the surface of the whole pronotum with a few scattered hairs, even more sparsely distributed than in *A. sphenarioides*; upper limit of the lateral lobes marked by a slender black stripe, followed above by a somewhat broader rufous band, fading to yellowish, and narrowed in the female; this stripe does not extend upon the head. Tegmina wanting in the male, very slender, linear, straight and green in the female. Legs green, the hind femora tipped, at least in the male, with rufo-testaceous and black; hind tibiae glaucous; hind tarsi red, with black-edged arolium and black-tipped red claws. Abdomen, in the female, with an obscure testaceous mediodorsal stripe, extending upon the thorax, and, on the abdomen, followed by an obscure laterodorsal series of small dark spots; or, in the male, with a similar distinct stripe, bordered by a more or less distinct narrow or broad edging of black, fading laterally into fuscous; supraanal plate of male moderately long and slender, tapering from the base, at first gently, near tip rapidly, the apex slightly obtusangulate, the margins elevated, a median sulcus extending over the basal half, bounded by pronounced but rounded ridges which unite in the middle of the plate and then continue halfway to the tip; furcula consisting of a pair of short, cylindrical lobes diverging at right angles, projecting but little over the supraanal plate; cerci regularly conical except that they are feebly compressed, acuminate, straight, reaching the tip of the supraanal plate; infracerebral plates broad, sulcate, broadly rounded apically, but acutely acuminate at the middle line, extending just beyond the supraanal plate.

Length of body, male, 13.5 mm., female, 20.5 mm.; antennae, male, 6.5 mm., female, 5.4 mm.; tegmina, female, 1.85 mm.; hind femora, male, 8.5 mm., female, 10 mm.

Two males, 1 female. Fort Reed, Orange County, Florida, April 10-21, J. H. Comstock.

3. APTENOPEDES APTERA.

(Plate XXVI, fig. 12.)

Aptenopedes aptera SCUDDER!, Proc. Bost. Soc. Nat. Hist. (1877), p. 86; Ent. Notes, VI (1878), p. 27.—BRUNER, Rep. U. S. Ent. Comm., III (1883), p. 55.

Body green; head green; eyes narrower, at least in the female, than in *A. sphenarioides*, more closely approximated above, and the fastigium in advance of them less swollen. Thorax with sculpturing similar to that in *A. sphenarioides*, but wholly devoid of any lateral stripe or with feeblest signs of the same in the female; in the male, however, there is a faint pallid stripe, edged feebly, narrowly, and interruptedly beneath with very dark green. Tegmina wholly wanting in both sexes. Legs as in the other species, except in wanting the testaceous color on the outer half of the upper face of the hind femora. Abdomen green, with a mediodorsal testaceous stripe with obscurely infuscated edges, extending also over the meso- and metanota; supraanal plate of male subtriangular, with slightly convex sides, the apex acutely angulate, the surface tolerably flat except that the lateral margins are elevated on the basal half, the extreme tip is suddenly raised to a higher level, and the median basal sulcus, which reaches to the middle of the plate, is flanked by heavy parallel walls which unite beyond its tip and extend nearly to the apex of the plate; furcula consisting of a pair of minute, rounded, divergent lobes, seated upon the ridges bounding the median sulcus of the supraanal plate; cerci much as in *A. rufovittata*, but tapering a little more rapidly on the basal than on the apical half; infracercal plates very broad, concave, tapering, extending beyond the supraanal plate by their slightly thickened, bluntly pointed, slightly separated apices.

Length of body, male, 19.5 mm., female, 24 mm.; antennae, male, 8 mm., female, 6.5 mm.; hind femora, male, 11.25 mm., female, 10.5 mm.

One male, 3 females. Fort Reed, Orange County, Florida, April 27, J. H. Comstock; Jacksonville, Duval County, Florida, August, W. H. Ashmead (U.S.N.M.); Texas (U.S.N.M.).

APPENDIX.

I. LIST OF HERETOFORE-DESCRIBED SPECIES OF NORTH AMERICAN MELANOPLI, IN THEIR ORIGINAL AND PRESENT NOMENCLATURE, ALPHABETICALLY ARRANGED BY SPECIES UNDER THE FORMER.

1877. *Pezotettix abditum* Dodge = *Melanoplus dawsoni*.
 1875. *Pezotettix acutipennis* Scudder = *Campylacantha acutipennis*.
 1876. *Pezotettix alba* Dodge = *Hypochlora alba*.
 1877. *Caloptenus angustipennis* Dodge = *Melanoplus angustipennis*.
 1877. *Aptenopedes aptera* Scudder = *Aptenopedes aptera*.
 1870. *Caloptenus arcticus* Walker = ? *Melanoplus borealis*.
 1879. *Pezotettix aridus* Scudder = *Melanoplus aridus*.
 1879. *Melanoplus arizonae* Scudder = *Melanoplus arizonae*.
 1879. *Pezotettix aspirans* Scudder = *Podisma dodgei*.
 1875. *Caloptenus atlantis* Riley = *Melanoplus atlantis*.
 1877. *Paroxya atlantica* Scudder = *Paroxya atlantica*.
 1876. *Pezotettix autumnalis* Dodge = *Phoetallotes nebrascensis*.
 1861. *Platyphyma aztecum* Saussure = *Aidemona azteca*.
 1870. *Caloptenus bilituratus* Walker = *Melanoplus bilituratus*.
 1825. *Gryllus bivittatus* Say = *Melanoplus bivittatus*.
 1878. *Pezotettix bohemani* Stål = *Podisma dodgei*.
 1861. *Acridium* (*Podisma*) *borckii* Stål = *Melanoplus borckii*.
 1868. *Pezotettix borealis* Scudder = *Melanoplus fasciatus*.
 1854. *Caloptenus borealis* Fieber = *Melanoplus borealis*.
 1879. *Melanoplus bowditchi* Scudder = *Melanoplus bowditchi*.
 1874. *Ommatolampis brevipennis* Thomas = *Hesperotettix brevipennis*.
 1891. *Melanoplus cenchri* McNeill = *Melanoplus flavidus*.
 1878. *Melanoplus cinereus* Scudder = *Melanoplus cinereus*.
 1877. *Caloptenus clypeatus* Scudder = *Melanoplus clypeatus*.
 1878. *Melanoplus collaris* Scudder = *Oedaleonotus enigma*.
 1878. *Melanoplus collinus* Scudder = *Melanoplus collinus*.
 1861. *Peopedetes corallinus* Saussure. Undetermined; perhaps not belonging to this group.
 1879. *Melanoplus curtus* Scudder = *Melanoplus fasciatus*.
 1875. *Pezotettix dawsoni* Scudder = *Melanoplus dawsoni*.
 1875. *Caloptenus deletor* Scudder = *Melanoplus deletor*.
 1878. *Melanoplus devastator* Scudder = *Melanoplus devastator*.
 1875. *Caloptenus devorator* Scudder = *Melanoplus femur rubrum*.
 1865. *Acridium differentiale* Uhler = *Melanoplus differentialis*.
 1879. *Pezotettix discolor* Scudder = *Melanoplus discolor*.
 1871. *Caloptenus dodgei* Thomas = *Podisma dodgei*.
 1879. *Pezotettix dumicolus* Scudder = *Melanoplus dumicola*.
 1861. *Pezotettix edax* Saussure = *Melanoplus femoratus*.
 1876. *Pezotettix enigma* Scudder = *Oedaleonotus enigma*.
 1788. *Gryllus* (*Locusta*) *erythropus* Gmelin = *Melanoplus femur rubrum*.
 1870. *Caloptenus extremus* Walker = *Melanoplus extremus*.
 1870. *Caloptenus fasciatus* Walker = *Melanoplus fasciatus*.
 1875. *Caloptenus fasciatus* Scudder = *Melanoplus packardii*.
 1791. *Acridium femorale* Olivier = *Melanoplus femur rubrum*.
 1838. *Caloptenus femoratus* Burmeister = *Melanoplus femoratus*.
 1773. *Acridium femur rubrum* De Geer = *Melanoplus femur rubrum*.
 1879. *Pezotettix flabellatus* Scudder = *Melanoplus flabellatus*.
 1879. *Melanoplus flabellifer* Scudder = *Melanoplus flabellifer*.
 1879. *Melanoplus flavidus* Scudder = *Melanoplus flavidus*.
 [1877. *Pezotettix flavoannulatus* La Munyon = *Dactylotum pictum*.]
 1874. *Caloptenus* [sic] *flavolineatus* Thomas. Undetermined.
 1841. *Acridium flavovittatum* Harris = *Melanoplus bivittatus*.
 1874. *Caloptenus floridianus* Thomas = *Paroxya floridana*.

1879. *Melanoplus foedus* Scudder = *Melanoplus foedus*.
 1872. *Aeridium frontalis* Thomas = *Hesperotettix speciosus*.
 1862. *Pezotettix glacialis* Scudder = *Podisma glacialis*.
 1875. *Caloptenus glaucipes* Scudder = *Melanoplus glaucipes*.
 1876. *Pezotettix gracilis* Bruner = *Melanoplus gracilis*.
 1872. *Caloptenus griseus* Thomas = *Melanoplus punctulatus*.
 1875. *Caloptenus helluo* Scudder = *Melanoplus punctulatus*.
 1893. *Melanoplus herbaceus* Bruner = *Melanoplus herbaceus*.
 1885. *Pezotettix hispidus* Bruner = *Bradynotes hispida*.
 1892. *Pezotettix hoosieri* Blatchley = *Paroxya hoosieri*.
 1875. *Pezotettix humphreysii* Thomas = *Melanoplus humphreysii*.
 1879. *Melanoplus infantilis* Scudder = *Melanoplus infantilis*.
 1879. *Melanoplus interior* Scudder = *Melanoplus femur rubrum*.
 1876. *Pezotettix juvenis* Scudder = *Oedaleonotus enigma*.
 1876. *Pezotettix juvenis* Dodge = *Melanoplus extremus*.
 1874. *Caloptenus keeleri* Thomas = *Melanoplus keeleri*.
 1878. *Melanoplus kennicottii* Scudder = *Melanoplus kennicottii*.
 1879. *Pezotettix lakinus* Scudder = *Melanoplus lakinus*.
 1837. *Loensta leucostoma* Kirby = ? *Melanoplus extremus*.
 1861. *Pezotettix longicornis* Saussure = ? *Melanoplus obovatipennis*.
 1891. *Dendrotettix longipennis* Riley MS. Bruner = *Dendrotettix quercus*.
 1876. *Caloptenus lurida* Dodge = *Melanoplus luridus*.
 1868. *Pezotettix manca* Smith = *Melanoplus maucus*.
 1876. *Pezotettix marginatus* Scudder = *Melanoplus marginatus*.
 1875. *Pezotettix marshallii* Thomas = *Podisma marshallii*.
 1879. *Pezotettix marshallii* Scudder = *Melanoplus altitudinum*.
 1872. *Pezotettix megacephala* Thomas MS. Dodge = *Phoetaliotes nebrascensis*.
 1861. *Pezotettix mexicana* Saussure. Undetermined.
 1861. *Platyphyma mexicanum* Bruner = *Paradichroplus mexicanus*.
 1870. *Caloptenus mexicanus* Walker = *Paradichroplus mexicanus*.
 1838. *Aeridium milberti* Serville = *Melanoplus femoratus*.
 1875. *Caloptenus minor* Scudder = *Melanoplus minor*.
 1876. *Pezotettix minutipennis* Thomas = *Melanoplus gracilis*.
 1873. *Platyphyma montana* Thomas = *Melanoplus montanus*.
 1885. *Bradynotes montanus* Bruner = *Aemoplus montanus*.
 1872. *Pezotettix nebrascensis* Thomas = *Phoetaliotes nebrascensis*.
 1877. *Caloptenus nigrescens* Scudder = *Melanoplus nigrescens*.
 1875. *Pezotettix nigrovittatus* Stål = *Philoceleon nigrovittatus*.
 1879. *Pezotettix nudus* Scudder = *Paraideмона punctata*.
 1872. *Pezotettix obesa* Thomas = *Bradynotes obesa*.
 1894. *Pezotettix obovatipennis* Blatchley = *Melanoplus obovatipennis*.
 1872. *Caloptenus occidentalis* Thomas = *Melanoplus occidentalis*.
 1876. *Pezotettix occidentalis* Bruner = *Melanoplus blatchleyi*.
 1875. *Pezotettix olivacea* Scudder = *Campylacantha olivacea*.
 1881. *Bradynotes opimus* Scudder = *Bradynotes obesa*.
 1875. *Pezotettix oregonensis* Thomas = *Podisma oregonensis*.
 1881. *Pezotettix pacificus* Scudder = *Melanoplus pacificus*.
 1878. *Melanoplus packardii* Scudder = *Melanoplus packardii*.
 1876. *Caloptenus parvus* Provancher = *Melanoplus extremus*.
 [1870. *Pezotettix picta* Thomas = *Dactylotum pictum*.]
 1877. *Caloptenus (Hesperotettix) picticornis* Thomas = *Poecilotettix picticornis*.
 1878. *Pezotettix pilosus* Stål = *Rhabdotettix pilosus*.
 1876. *Pezotettix plagosus* Scudder = *Aeoloplus plagosus*.
 1878. *Pezotettix plebejus* Stål = *Melanoplus plebejus*.
 1877. *Caloptenus plumbum* Dodge = *Melanoplus plumbus*.
 1875. *Caloptenus ponderosus* Scudder = *Melanoplus robustus*.
 1877. *Pezotettix puer* Scudder = *Melanoplus puer*.
 1878. *Pezotettix punctatus* Stål = *Paraideмона punctata*.
 1862. *Caloptenus punctulatus* Uhler MS. Scudder = *Melanoplus punctulatus*.
 1879. *Pezotettix pupaeformis* Scudder = *Melanoplus plebejus*.
 1888. *Dendrotettix quercus* Riley = *Dendrotettix quercus*.
 1877. *Paroxya recta* Scudder = *Paroxya floridana*.
 1878. *Melanoplus rectus* Scudder = *Melanoplus fasciatus*.
 1876. *Caloptenus regalis* Dodge = *Aeoloplus regalis*.
 1870. *Caloptenus repletus* Walker. Probably indeterminate.
 1875. *Caloptenus robustus* Scudder = *Melanoplus robustus*.
 1877. *Pezotettix rotundipennis* Scudder = *Melanoplus rotundipennis*.

1877. *Aptenopedes rufovittata* Scudder = *Aptenopedes rufovittata*.
 1878. *Pezotettix rusticus* Stål = *Melanoplus rusticus*.
 1877. *Caloptenus sanguinocephali* s *La Munion* = *Phoetaliotes nebrascensis*.
 1877. *Caloptenus sanguinolentus* Provancher = *Melanoplus femur rubra*.
 1870. *Caloptenus scriptus* Walker. Determinable only by comparison with types in the British Museum.
 1864. *Pezotettix scudderi* Uhler = *Melanoplus scudderi*.
 1870. *Caloptenus selectus* Walker. Determinable only by study of types in the British Museum.
 1861. *Pezotettix septentrionalis* Saussure = *Melanoplus borealis*.
 1872. *Pezotettix speciosa* Scudder = *Hesperotettix speciosa*.
 1877. *Aptenopedes sphenarioides* Scudder = *Aptenopedes sphenarioides*.
 1865. *Acridium spretis* Uhler MS. Thomas = *Melanoplus spretus*.
 1876. *Pezotettix stupefactus* Scudder = *Podisma stupefacta*.
 1861. *Pezotettix sumichrasti* Saussure = ? *Melanoplus bivittatus*.
 1876. *Pezotettix tellustris* Scudder = *Melanoplus dawsoni*.
 1879. *Melanoplus tenebrosus* Scudder = *Melanoplus keeleri*.
 1879. *Pezotettix texanus* Scudder = *Melanoplus texanus*.
 1872. *Caloptenus turnbulli* Thomas = *Aeoloplus turnbulli*.
 1873. *Pezotettix unicolor* Thomas = *Melanoplus scudderi*.
 1878. *Pezotettix varicolor* Stål = *Paradichroplis varicolor*.
 [1879. *Pezotettix variegatus* Scudder = *Dactyloptum variegatum*.]
 1879. *Melanoplus variolosus* Scudder = *Melanoplus occidentalis*.
 1876. *Pezotettix viola* Thomas = *Melanoplus viola*.
 1861. *Pedies virescens* Saussure. Undetermined; perhaps not belonging to this group.
 1872. *Caloptenus viridis* Thomas = *Hesperotettix viridis*.
 1876. *Pezotettix vivax* Scudder = *Campylacantha vivax*.
 1877. *Caloptenus volucris* Dodge = *Phoetaliotes nebrascensis*.
 1885. *Pezotettix washingtonianus* Bruner = *Melanoplus washingtonianus*.
 1875. *Caloptenus yarrowii* Thomas = *Melanoplus yarrowii*.
 1861. *Pezotettix zimmermanni* Saussure = ? *Melanoplus nigrescens*.

2. UNDETERMINED FORMS.

1. *Poepedetes corallinus* Saussure, Rev. Mag. Zool., 1861, p. 158. Mexico temperata. It is doubtful if this Mexican species, unknown to me, belongs in the Melanopli; it seems to be more nearly allied to *Dactyloptum*.
2. *Pezotettix fauriei* Bolivar, Anal. Soc. Esp. Hist. Nat., XIX (1890), pp. 322-323. This species from Yesso, Japan, seems to be a *Podisma*, but it is described from the female alone, so that I can not place it more closely.
3. *Caloptenus* (sic!) *flavolineatus* Thomas, Bull. U. S. Geol. Surv. Terr., I, 1st series, No. 2 (1874), p. 68. I am unable to determine this southern California species, and am tolerably confident I have not seen it; for in this case there is apparently sufficient in the description to fix the species when specimens are obtained. It has been thought by some to be *Oedaleonotus enigma collaris*, but that is scarcely possible.
4. *Pezotettix mexicana* Saussure, Rev. Mag. Zool., 1861, p. 160. Mexico temperata. From the description it is impossible to determine which of the many Mexican species this may be, but I suspect it may prove to be *Melanoplus atlantis*.
5. *Pezotettix mikado* Bolivar, Ann. Soc. Esp. Hist. Nat., XIX (1890), p. 323. Yesso, Japan. Like the other species of Bolivar, No. 2, this is described from the female only, and I can not place it. It is presumably a *Podisma*.
6. *Caloptenus repletus* Walker, Cat. Derm. Salt. Brit. Mus., IV (1870), pp. 678-679. I had thought this species to be probably *Melanoplus bilituratus*, but there was little in Walker's description whereon to base an opinion. Mr. Samuel Henshaw, however, kindly compared *bilituratus* with the specimens placed under *repletus* in the British Museum and found them distinct. Walker credited it to "U. States" and "Vancouver's Island," one specimen each, but Mr. Henshaw found no specimens from Vancouver, but two males and a female from "North America," one specimen being further labeled "Illinois." The two males were different species, one being *Melanoplus femoratus*, the other (Illinois) distinct, but allied to it by the cerci, though with short tegmina (probably *Melanoplus viola*). It was further doubtful whether the female belonged with either of the males. Certainly, then, we shall be obliged to consign Walker's species to merited oblivion. Probably no one of these specimens is one of the original types.
7. *Calliptamus sanguineipes* Serville, Rev. Méth. Orth. (1831), pp. 93-94 [*Acrydium sanguineipes* Olivier, Encycl. Méth., VI (1791), p. 231]. Surinam. It is very doubtful if this belongs in the Melanopli. If De Geer's *Acridium aeneo-oculatum* is the same¹ his figure would lead us to presume it did not. I have not seen the species.

¹ See Serv., Orth., p. 670.

8. *Caloptenus scriptus* Walker, Cat. Derm. Salt. Brit. Mus., IV (1870), pp. 680-681. The only form to which I was inclined to refer this was that described here as *Melanoplus bilituratus*, but from Mr. Henshaw's examination of the types (see that species, p. 176) it can not be that, and I therefore find it at present indeterminate. I have specimens from Vancouver, the origin of Walker's species, which may possibly be referred to *scriptus*, since they differ from *Melanoplus bilituratus* in the points specified by Mr. Henshaw, but as I possess only females I do not feel satisfied of their specific validity.

9. *Caloptenus selectus* Walker, Cat. Derm. Salt. Brit. Mus., IV (1870), p. 682. Walker's types (from Oajaca, Mexico) were examined at my request by Mr. Henshaw to see whether they belong in the group Melanopli at all, and he states that they do. It is quite impossible by Walker's description even to guess to what genus it belongs, much less to determine the species without a direct comparison with the types. I know of no species with a broad, interrupted, piceous stripe along the costa of the tegmina.

10. *Pedies virecens* Saussure, Rev. Mag. Zool., 1861, pp. 157-158. Mexico. I have not been able to determine this species among my material, and question very much whether it belongs in the Melanopli. I am more inclined to think it allied to *Daetylotum*.

11. *Podisma viridis* Blanchard, Gay, Faun. Chil., Zool., VI (1851), pp. 75, 76. Chile. This is not one of the Melanopli, but belongs to *Antandrus* Stål.

Several other species have not been definitely determined, but have been placed in the synonymy of the described species with a mark of doubt. Such are *Caloptenus arcticus* Walker, *Locusta leucostoma* Kirby, *Pezotettix longicornis* Saussure, *P. sunichrasti* Saussure, and *P. zimmermanni* Saussure, for which see the last preceding list (Appendix 1).

3. LIST OF SOUTH AMERICAN MELANOPLI.¹

1. *Atrachelacris unicolor* Giglio Tos, Boll. Mus. Tor., IX, Ort. Viagg. Borelli, 1894, p. 21. Argentine Republic, Paraguay.

2. *Dichroplus amoenus* [*Pezotettix amoenus* Stål, Bih. K. Sv. Vet.-Akad. Handl., V, No. 9 (1878), p. 8.] (Locality ?)

3. *Dichroplus arrogans* [*Acridium* (*Podisma*) *arrogans* Stål, Eug. Resa, Orth., 1860, p. 333; *Pezotettix* (*Dichroplus*) *arrogans* Stål, Rec. Orth., I (1873), p. 78; *Pezotettix arrogans* Stål, Obs. Orthopt., III (1878), p. 6; *Acridium strobeltii* Brunner (MS. ?)]. Argentine Republic, Uruguay.

4. *Dichroplus bergii* [*Pezotettix bergii* Stål, Bih. K. Sv. Vet.-Akad. Handl., V, No. 9 (1878), pp. 6, 7; *Acridium crassipes* Brunner (MS. ?)]. Argentine Republic, Paraguay, Brazil.

5. *Dichroplus bicolor* Giglio Tos, loc. cit., 1894, pp. 21-22. Argentine Republic, Paraguay.

6. *Dichroplus cliens* [*Acridium* (*Podisma*) *cliens* Stål, Eug. Resa, Orth., 1860, p. 335; *Pezotettix* (*Dichroplus*) *cliens* Stål, Rec. Orth., I (1873), p. 78; *Pezotettix cliens* Stål, Obs. Orthopt., III (1878), p. 6]. Uruguay.

7. *Dichroplus distinguendus* Giglio Tos, loc. cit., 1894, pp. 22-23. Paraguay.

8. *Dichroplus elongatus* Giglio Tos, loc. cit., 1894, pp. 23-24. Argentine Republic, Paraguay.

9. *Dichroplus exilis* Giglio Tos, loc. cit., 1894, p. 23; Argentine Republic, Paraguay.

10. *Dichroplus fuscus* [*Gryllus fuscus* Thunberg, Mém. Acad. St. Petersb., V (1815), p. 235; *Pezotettix* (*Trigonophymus*) *fuscus* Stål, Rec. Orth., I (1873), p. 78]. Argentine Republic, Nova Cambria.

11. *Dichroplus lemniscatus* [*Acridium* (*Podisma*) *lemniscatum* Stål, Eug. Resa, Orth., 1860, p. 334; *Pezotettix* (*Dichroplus*) *lemniscatus* Stål, Rec. Orth., I (1873), p. 78; *Pezotettix lemniscatus* Stål, Obs. Orthopt., III (1878), p. 6]. Argentine Republic, Brazil.

12. *Dichroplus patruelis* [*Acridium* (*Podisma*) *patruelis* Stål, Eug. Resa, Orth., 1860, p. 334; *Pezotettix* (*Dichroplus*) *patruelis* Stål, Rec. Orth., I (1873), p. 78; *Pezotettix patruelis* Stål, Obs. Orth., III (1878), p. 6; ? *Acridium vittigerum* Blanchard, Gay, Faun. Chil., Zool., VI (1851), pp. 73-74 (not *Acrid. vittigerum* Blanchard, Voy. pole sud., Zool., IV (1853), pp. 371-372, pl. III, fig. 9)]. Argentine Republic, Paraguay, Uruguay. If Blanchard's Chilian *vittigerum* belongs here it must take precedence.

13. *Dichroplus peruvianus* [*Pezotettix peruvianus* Stål, Bih. K. Sv. Vet.-Akad. Handl., V, No. 9 (1878), pp. 7-8]. Peru.

14. *Dichroplus punctulatus* [*Gryllus punctulatus* Thunberg, Mém. Acad. St. Petersb., IX (1824), p. 408; *Pezotettix punctulatus* Stål, Obs. Orth., III (1878), p. 6; *Acridium* (*Podisma*) *fraternum* Stål, Eug. Resa, Orth., 1860, p. 333]. Argentine Republic, Uruguay, Brazil, New Grenada, Colombia.

15. *Dichroplus robustulus* [*Pezotettix robustulus* Stål, Bih. K. Sv. Vet.-Akad. Handl., V, No. 9 (1878), p. 7]. Southern Brazil.

16. *Paradichroplus aberrans* Giglio Tos, loc. cit., 1894, p. 28. Paraguay.

17. *Paradichroplus bipunctatus* Giglio Tos, loc. cit., 1894, pp. 26-27. Paraguay.

18. *Paradichroplus borellii* Giglio Tos, loc. cit., 1894, pp. 27-28. Paraguay.

19. *Paradichroplus brunneri* Giglio Tos, loc. cit., 1894, pp. 25-26. Argentine Republic, Paraguay.

20. *Pezotettix antisanae* Bolivar, Anal. Soc. Esp. Hist. Nat., X, Notes Ent. (1881), pp. 36-37. Antisana, Ecuador.

21. *Scopas obesus* Giglio Tos, loc. cit., 1894, p. 29. Paraguay.

22. *Scotussa unpudica* Giglio Tos, loc. cit., 1894, p. 25. Uruguay.

¹Not including those mentioned in the body of this memoir.

EXPLANATION OF PLATES.

With the exception of a few figures specially noted below, all the drawings for these plates were made by Mr. J. Henry Blake, of Cambridge, Massachusetts, and the expense met by a special grant for the purpose from the ELIZABETH THOMPSON SCIENCE FUND, which is here gratefully acknowledged.

Unless otherwise stated (under the names of individuals or institutions placed in parentheses), all the drawings of American species were made from specimens in my own collection. Plate I illustrates the venation of the tegmina in a few species, and the figures are here magnified five diameters. The remaining plates show the abdominal appendages of the males of all but two or three of the species, and these are magnified four diameters.

PLATE I.

- FIG. *a.* *Melanoplus dawsoni completus*, male. Clifford, North Dakota (L. Bruner).
b. *Melanoplus gladstoni*, male. Medicine Hat, Assiniboia.
c. *Melanoplus fasciatus volaticus*, male. Charlevoix, Michigan (L. Bruner).
d. *Melanoplus borealis*, male. Labrador coast, latitude 59°.
e. *Phoetaliotes nebrascensis volucris*, male. Dallas, Texas.
f. *Melanoplus extremus scandens*, male. Mount Washington, New Hampshire.
g. *Melanoplus extremus junius*, male. Jackson, New Hampshire.
h. *Melanoplus femur rubrum*, male. Adirondacks, New York.
i. *Melanoplus marginatus amplus*, male. California (U.S.N.M.).
k. *Melanoplus paroxyoides*, male. Key West, Florida.

PLATE II.

- FIG. 1. *Gymnoscirtetes pusillus*. Jacksonville, Florida (L. Bruner). From a type specimen.
 2. *Netrosoma fusiformis*. Montelovez, Mexico.
 3. *Netrosoma nigropleura*. Lerdo, Mexico (L. Bruner). From a type specimen.
 4. *Paradichroplus mexicanus*. Orizaba, Mexico. From Walker's type of *Caloptenus mexicanus*, the drawings obtained at the British Museum by Mr. S. Henshaw; magnification unknown; the specimen is a nymph.
 5. *Paradichroplus mexicanus*. Orizaba, Mexico.
 6. *Paradichroplus varicolor*. Columbia.
 7. *Phaedrotettix angustipennis*. Mount Alvarez, Mexico.
 8. *Conalcaea miguelitana*. Sierra de San Miguelito, Mexico.
 9. *Conalcaea neomexicana*. Silver City, New Mexico (L. Bruner).
 10. *Barytettix crassus*. Lower California (L. Bruner).
 11. *Phaulotettix compressus*. Montelovez, Mexico.

PLATE III.

- FIG. 1. *Cephalotettix parvulus*. Otoyac, Mexico (L. Bruner). From a type specimen.
 2. *Rhabdotettix concinnus*. Waco, Texas (Mus. Comp. Zool.).
 3. *Rhabdotettix palmeri*. Montelovez, Mexico.
 4. *Cyclocercus bistrigata*. Venis Mecas, Mexico.
 5. *Cyclocercus accola*. Goliad, Texas.
 6. *Cyclocercus valga*. Sierra Nola, Mexico.
 7. *Sinaloa behrensii*. Sinaloa, Mexico.
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 9. *Podisma marshallii*. Mount Lincoln, Colorado.
 10. *Podisma oregonensis*. Henry Lake, Idaho (L. Bruner).

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- FIG. 1. *Melanoplus reflexus*. Valle del Maiz, Mexico.
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 8. *Melanoplus montanus*. Montana (L. Bruner).
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 10. *Melanoplus scitulus*. Mount Alvarez, Mexico.

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- FIG. 1. *Melanoplus flabellatus*. Dallas, Texas. From a type specimen.
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 10. *Melanoplus complanatipes*. Cape St. Lucas, Lower California.

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- FIG. 1. *Melanoplus canonicus*. Grand Canyon of the Colorado, Arizona (L. Bruner).
 2. *Melanoplus comptus*. Sidney, Nebraska (L. Bruner).
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 10. *Melanoplus corpulentus*. Sierra de San Miguelito, Mexico.

PLATE XXI.

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 2. *Melanoplus packardii*. West Point, Nebraska (L. Bruner). (Specimen with blue hind tibiae.)
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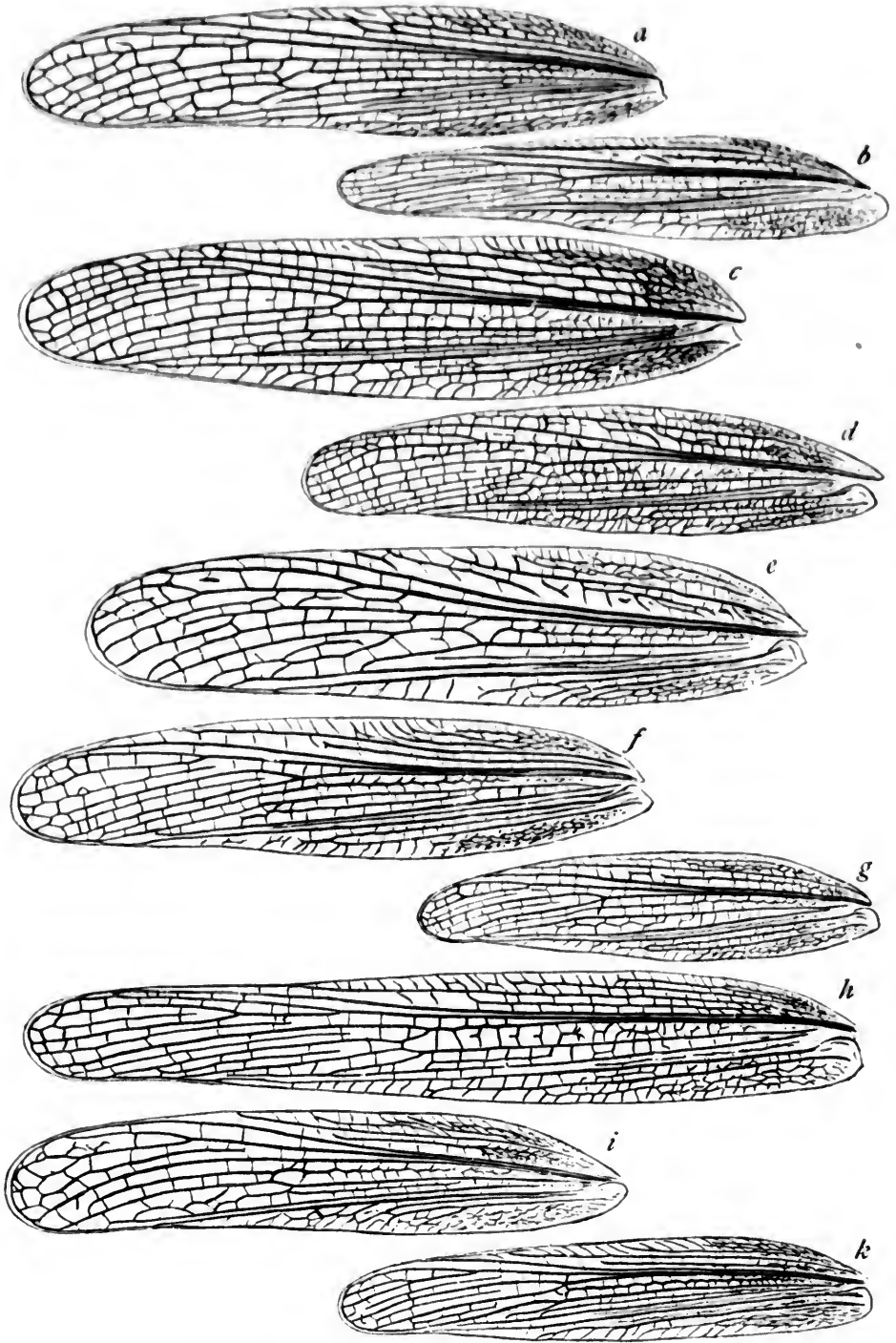
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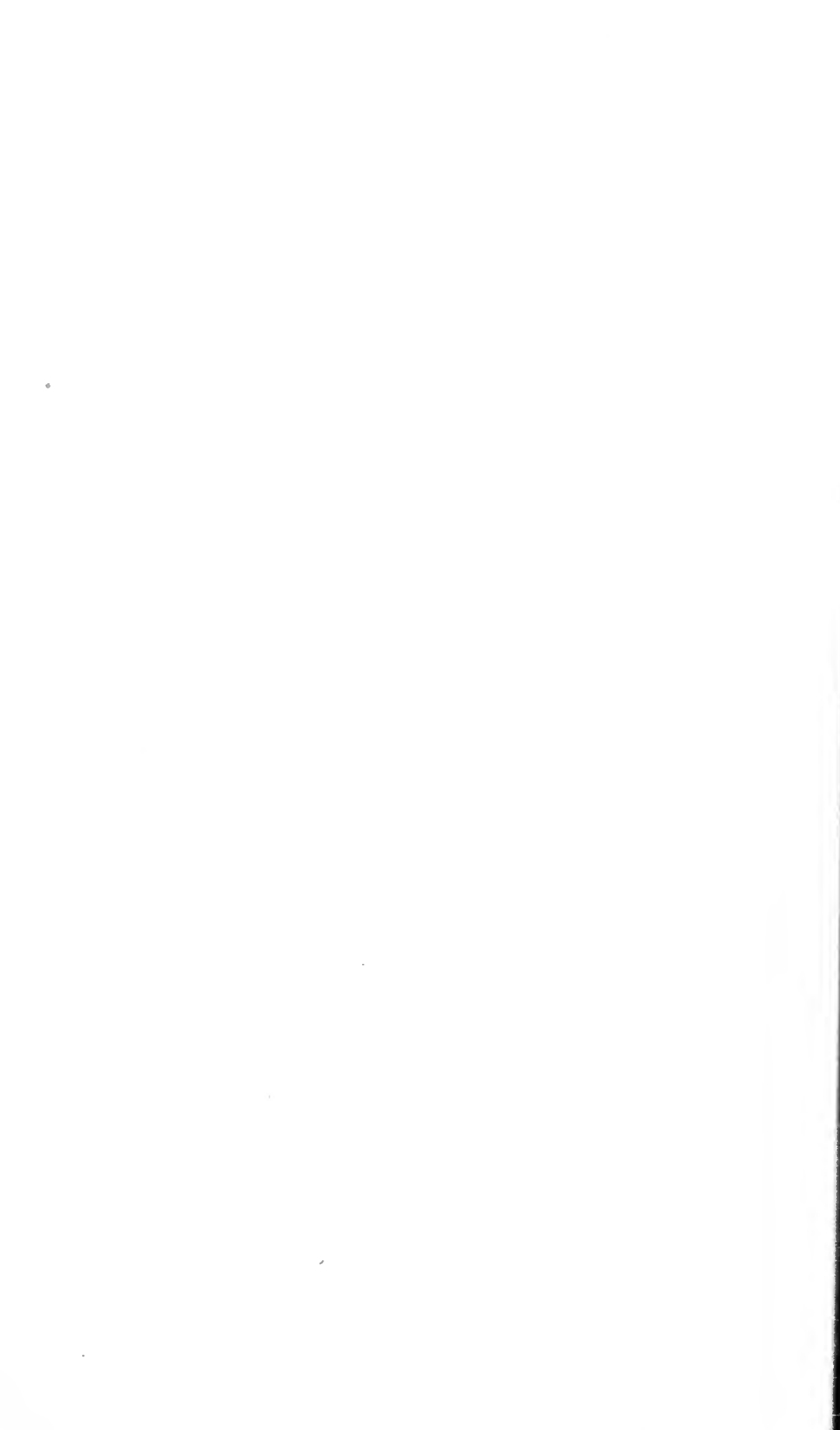
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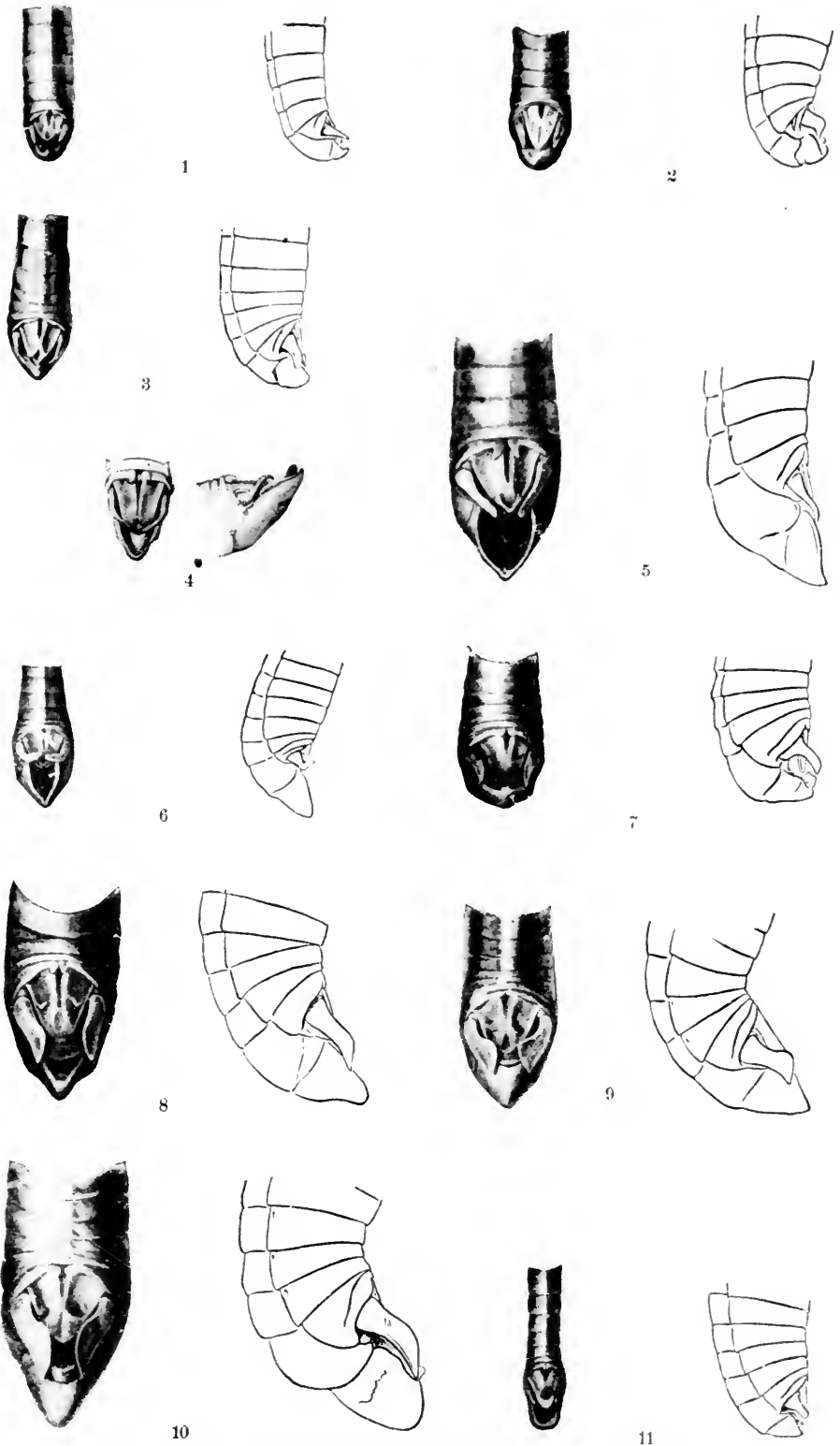




TEGMINA OF SPECIES OF MELANOPLUS AND PHOETALIOTES.

FOR EXPLANATION OF PLATE SEE PAGE 407.

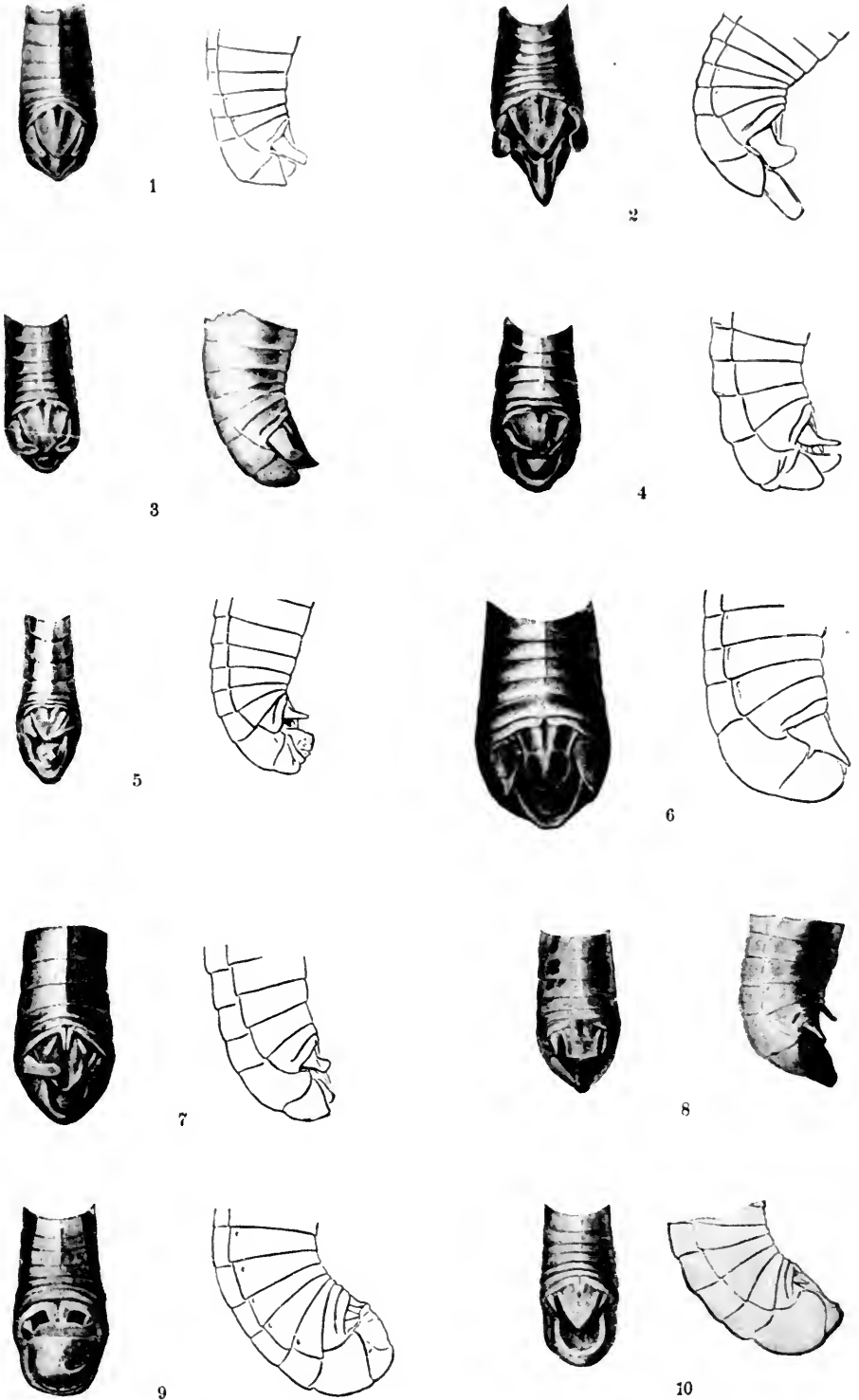




MALE ABDOMINAL APPENDAGES OF GYMNOSCIRTETES, NETROSOMA, PARADICHRPLUS, PHAEDROTETTIX, CONALCAEA, BARYTETTIX, AND PHAULOTETTIX.

FOR EXPLANATION OF PLATE SEE PAGE 407.





MALE ABDOMINAL APPENDAGES OF CEPHALOTETTIX, RHABDOTETTIX, CYCLOCERCUS, SINALOA, AND PARAIDEMONA.

FOR EXPLANATION OF PLATE SEE PAGE 407.





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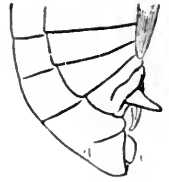
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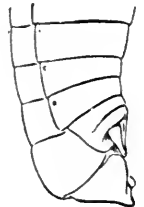
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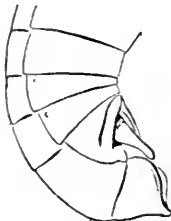
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MALE ABDOMINAL APPENDAGES OF AIDEMONA, HYPOCHLORA, CAMPYLACANTHA, EOTETTIX, AND HESPEROTETTIX.

FOR EXPLANATION OF PLATE SEE PAGES 407, 408.





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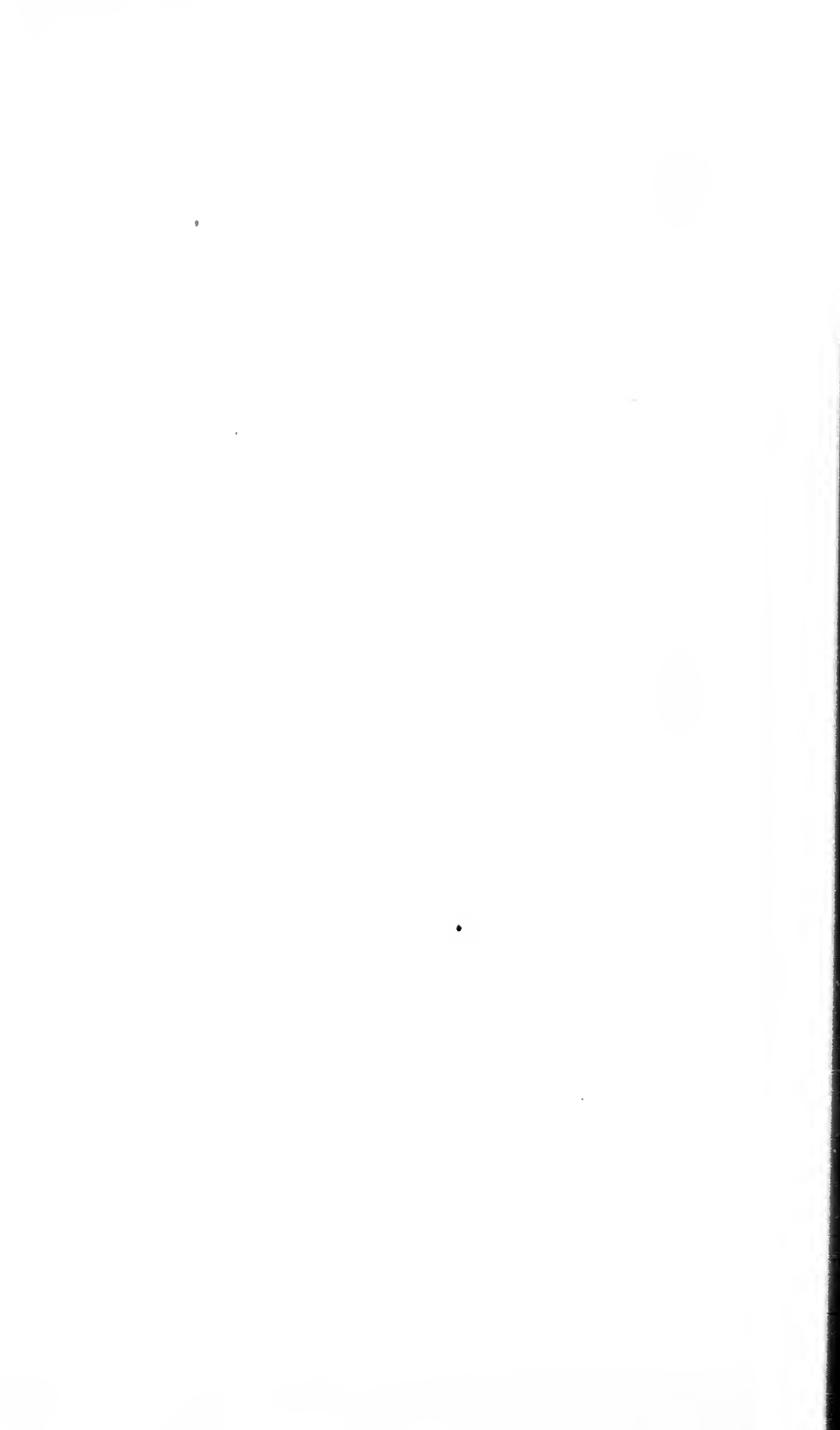


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MALE ABDOMINAL APPENDAGES OF HESPEROTETTIX AND AEOLOPLUS.

FOR EXPLANATION OF PLATE SEE PAGE 408.





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MALE ABDOMINAL APPENDAGES OF AEOLOPLUS AND BRADYNOTES.

FOR EXPLANATION OF PLATE SEE PAGE 408.





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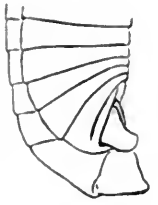
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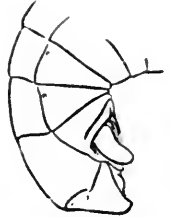
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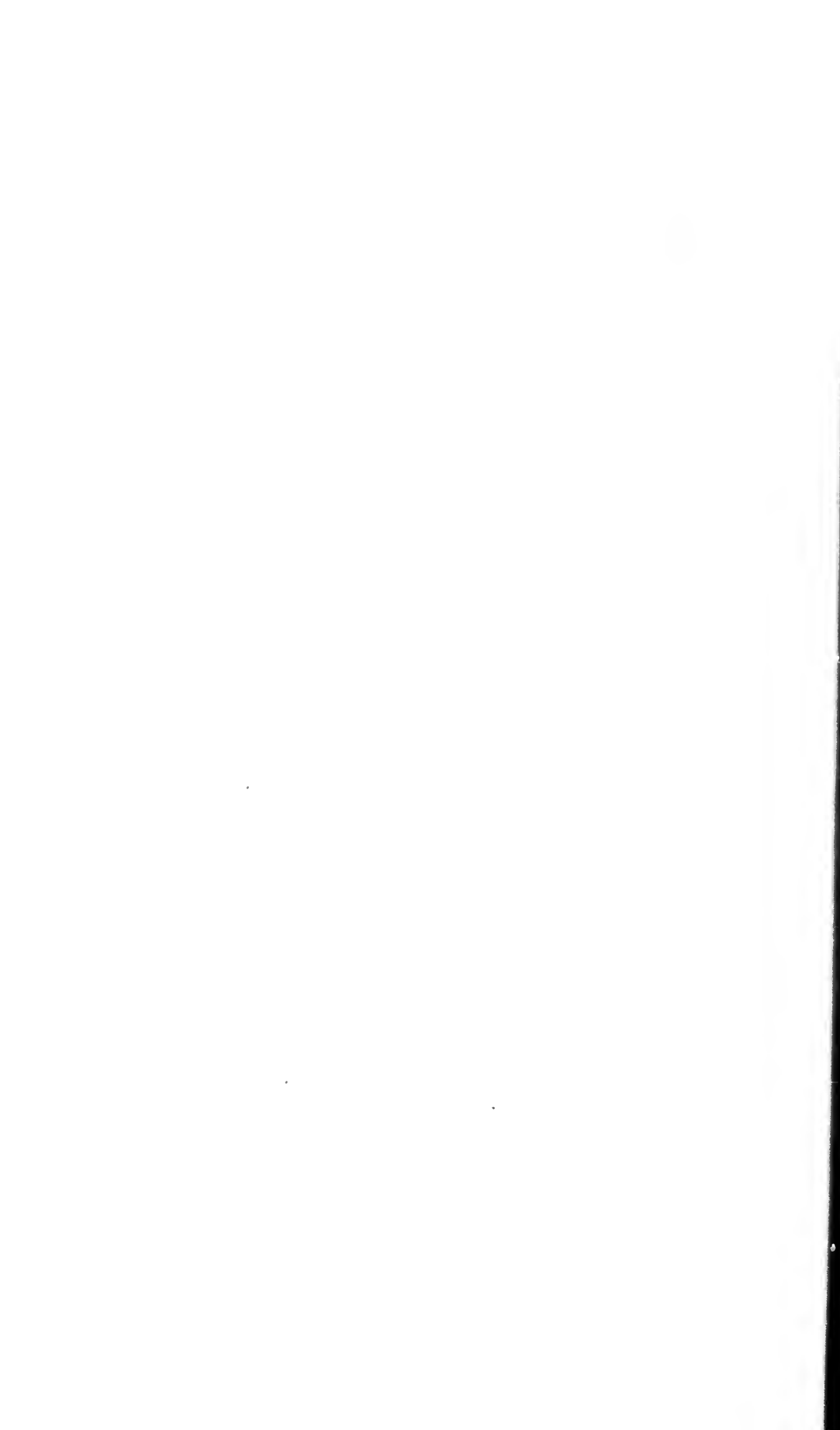


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MALE ABDOMINAL APPENDAGES OF BRADYNOTES, DENDROTETTIX, AND PODISMA.

FOR EXPLANATION OF PLATE SEE PAGE 408.





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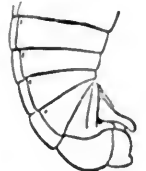
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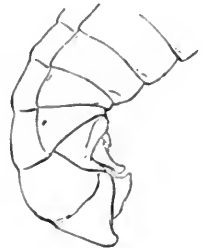
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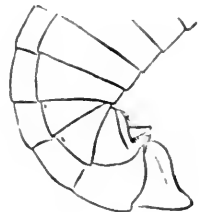
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MALE ABDOMINAL APPENDAGES OF OLD WORLD SPECIES OF PODISMA.

FOR EXPLANATION OF PLATE SEE PAGE 408.



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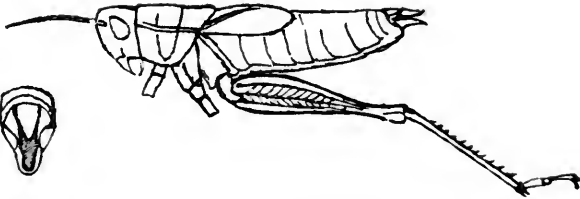
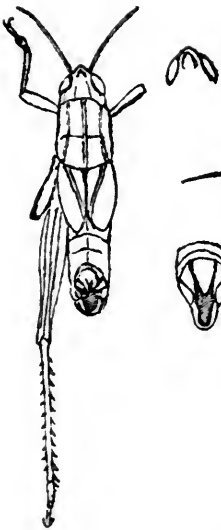
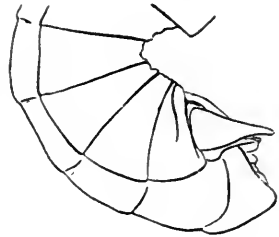
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MALE ABDOMINAL APPENDAGES OF *PODISMA* AND *PARATYLOTROPIDIA*;
PARATYLOTROPIDIA BRUNNERI.

FOR EXPLANATION OF PLATE SEE PAGE 409.



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MALE ABDOMINAL APPENDAGES OF MELANOPLUS.

FOR EXPLANATION OF PLATE SEE PAGE 409.



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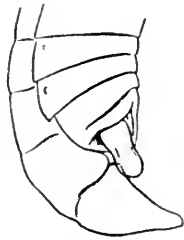
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MALE ABDOMINAL APPENDAGES OF MELANOPLUS.

FOR EXPLANATION OF PLATE SEE PAGE 409.



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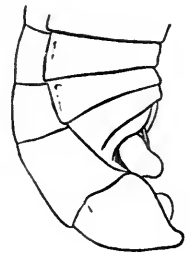
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MALE ABDOMINAL APPENDAGES OF MELANOPLUS.

FOR EXPLANATION OF PLATE SEE PAGE 409



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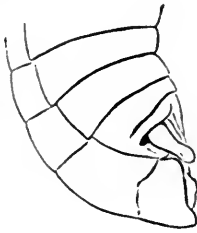
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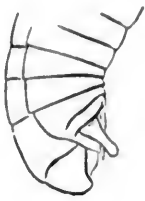


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MALE ABDOMINAL APPENDAGES OF MELANOPLUS.

FOR EXPLANATION OF PLATE SEE PAGES 409, 410.



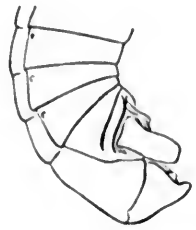
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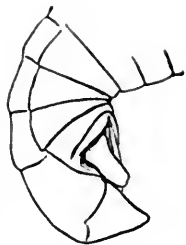
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MALE ABDOMINAL APPENDAGES OF MELANOPLUS.

FOR EXPLANATION OF PLATE SEE PAGE 410.



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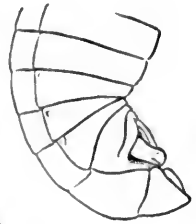
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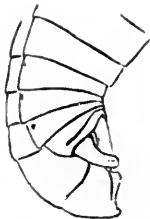
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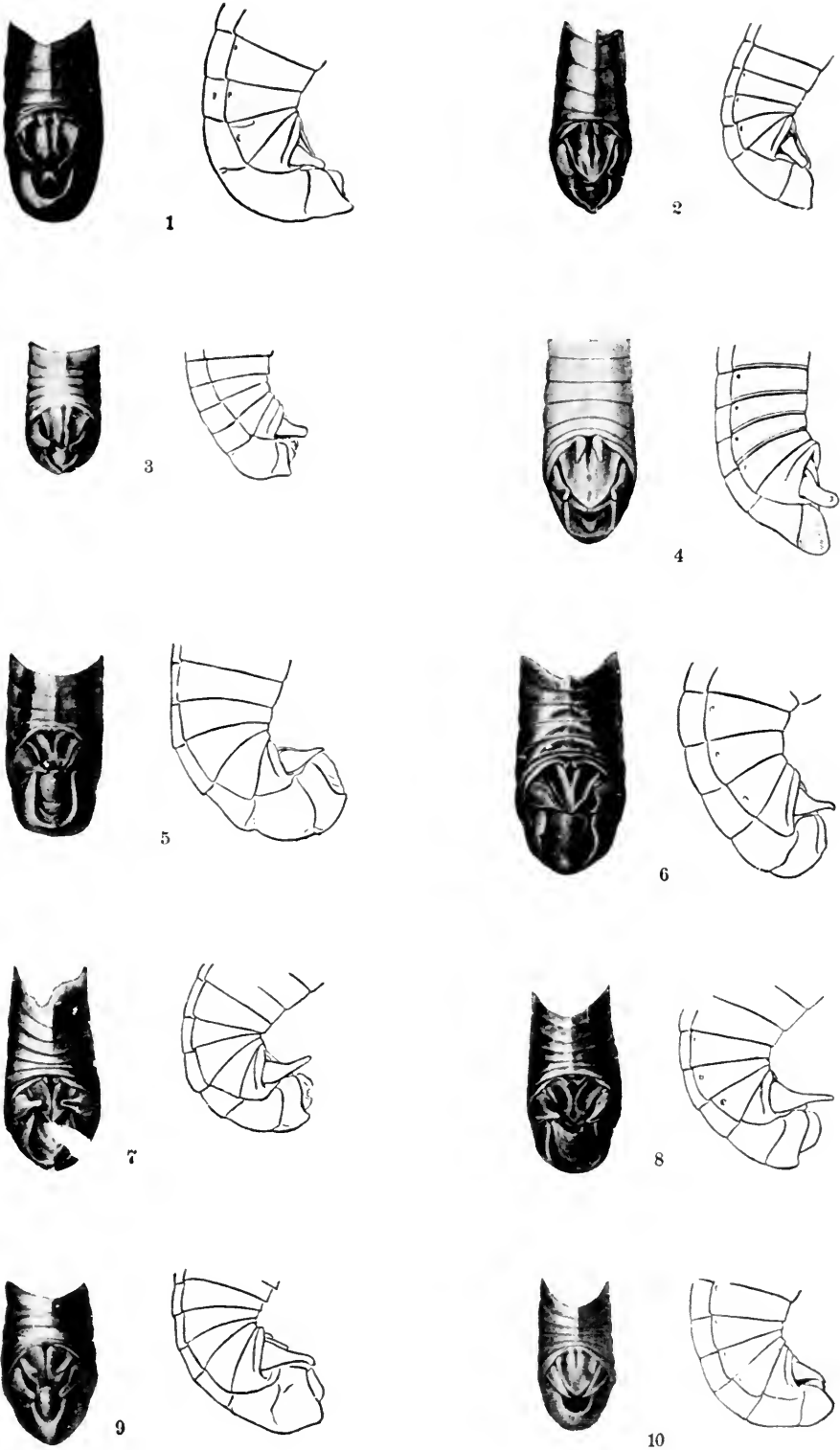


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MALE ABDOMINAL APPENDAGES OF MELANOPLUS.

FOR EXPLANATION OF PLATE SEE PAGE 410.



MALE ABDOMINAL APPENDAGES OF MELANOPLUS.

(For explanation of plate see page 410.)



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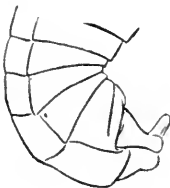
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MALE ABDOMINAL APPENDAGES OF MELANOPLUS.

FOR EXPLANATION OF PLATE SEE PAGE 410.

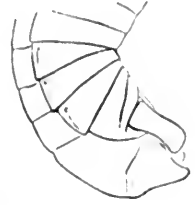




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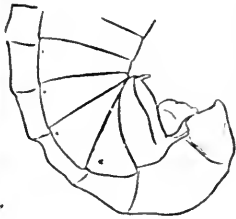
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MALE ABDOMINAL APPENDAGES OF MELANOPLUS.

FOR EXPLANATION OF PLATE SEE PAGE 411.



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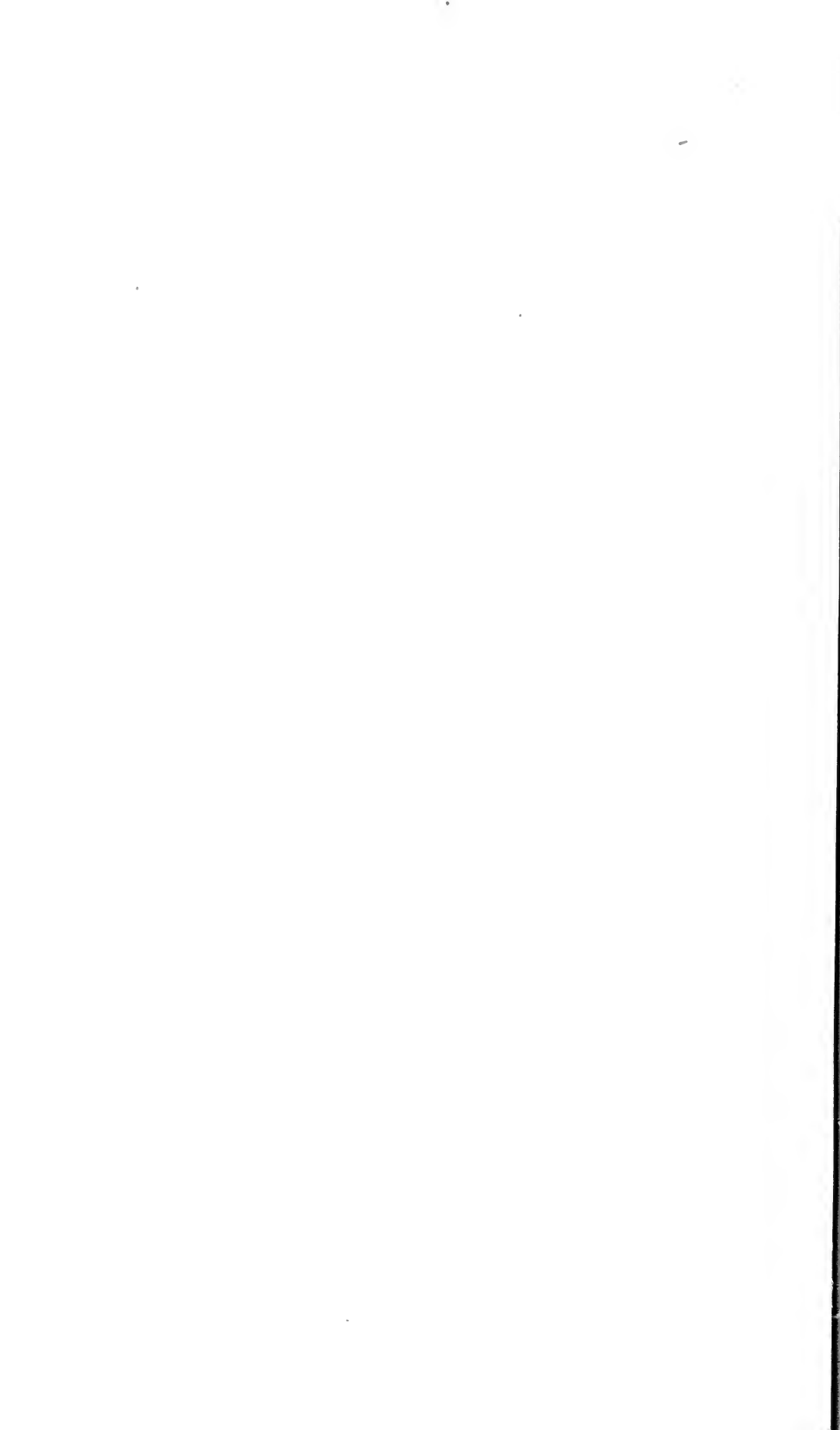
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MALE ABDOMINAL APPENDAGES OF MELANOPLUS.

FOR EXPLANATION OF PLATE SEE PAGE 411.





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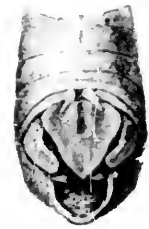
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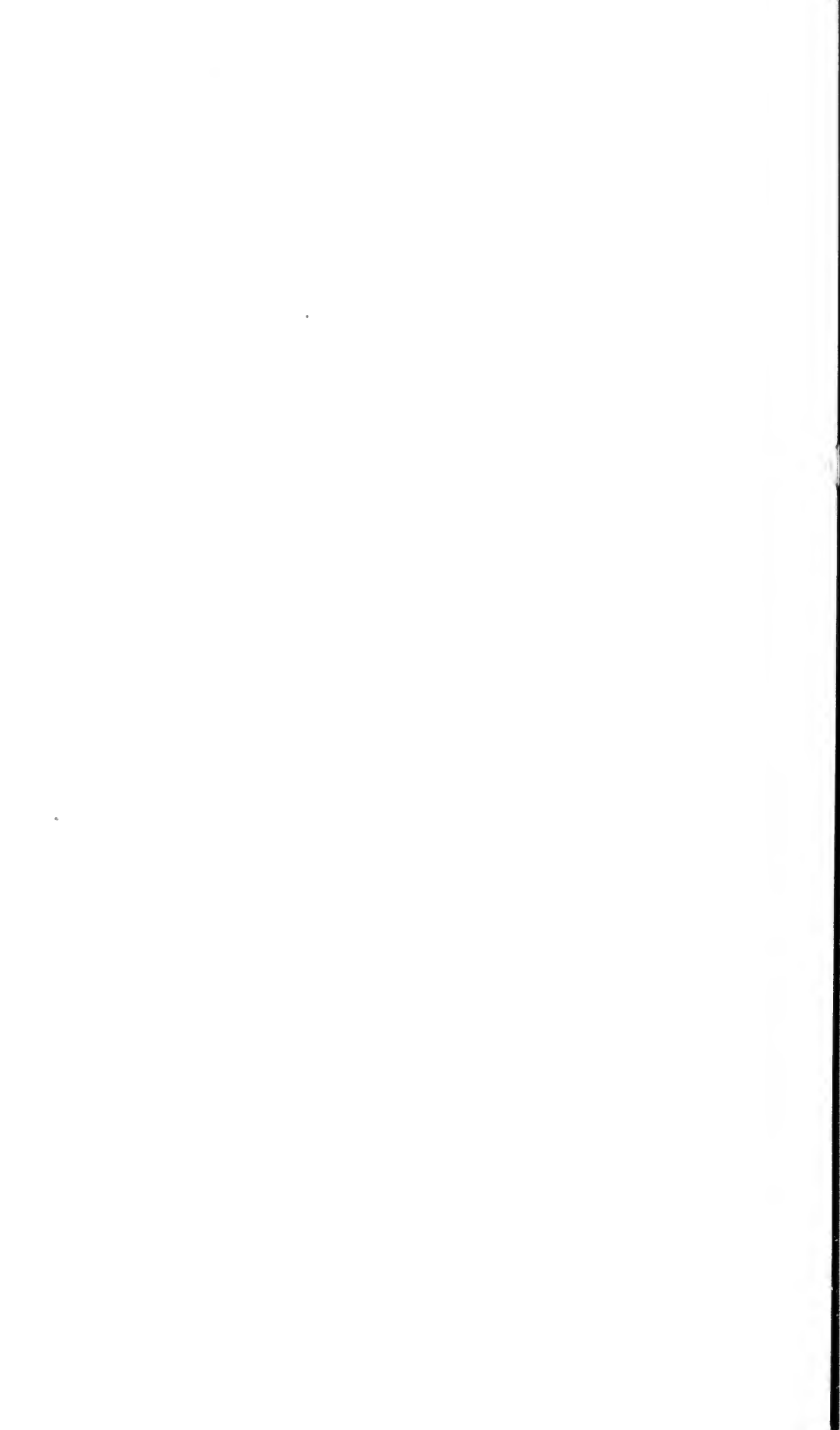
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MALE ABDOMINAL APPENDAGES OF MELANOPLUS.

FOR EXPLANATION OF PLATE SEE PAGE 411.





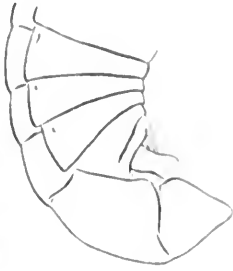
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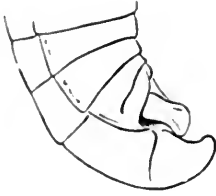
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MALE ABDOMINAL APPENDAGES OF MELANOPLUS.

FOR EXPLANATION OF PLATE SEE PAGE 411.



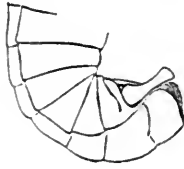
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MALE ABDOMINAL APPENDAGES OF MELANOPLUS.

FOR EXPLANATION OF PLATE SEE PAGES 411, 412.



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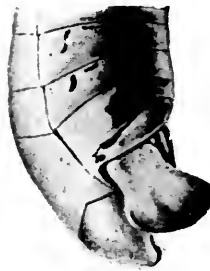
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MALE ABDOMINAL APPENDAGES OF MELANOPLUS.

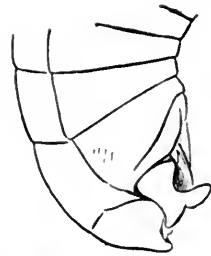
FOR EXPLANATION OF PLATE SEE PAGE 412.



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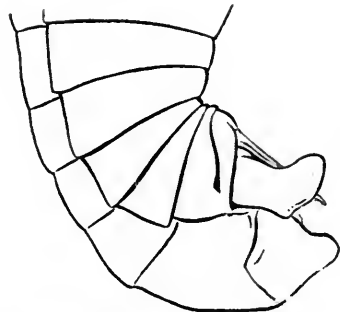
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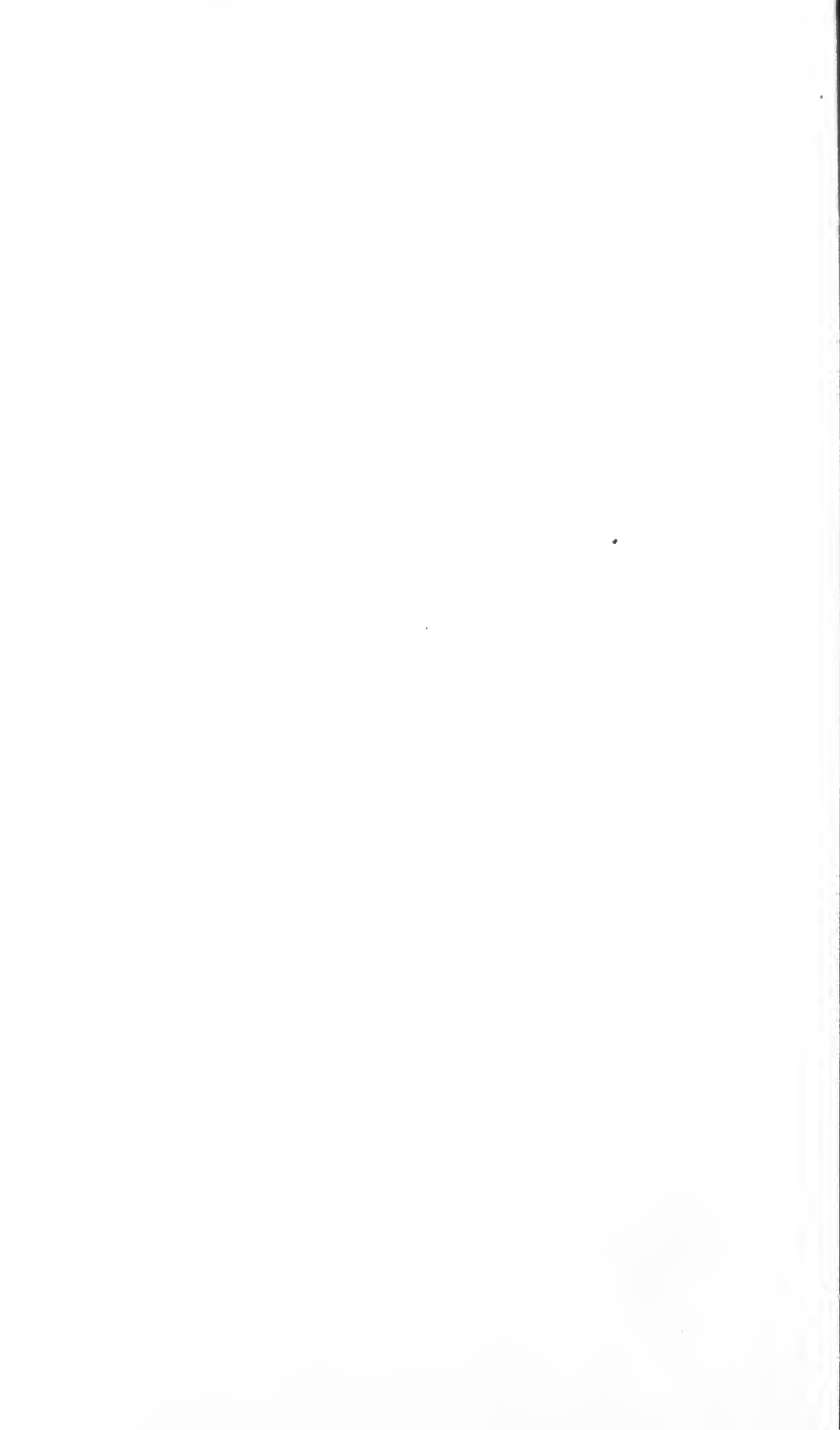
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MALE ABDOMINAL APPENDAGES OF MELANOPLUS.

FOR EXPLANATION OF PLATE SEE PAGE 412.





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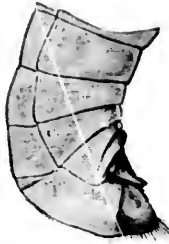
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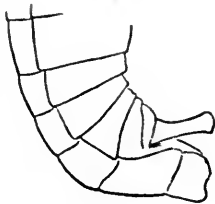
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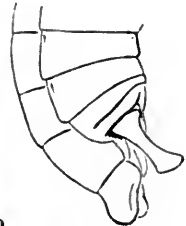
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MALE ABDOMINAL APPENDAGES OF MELANOPLUS, PHOETALIOTES, AND PAROXYA.

FOR EXPLANATION OF PLATE SEE PAGE 412.



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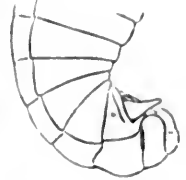
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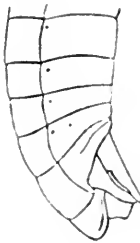
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MALE ABDOMINAL APPENDAGES OF POECILOTTETIX, OEDALEONOTUS, ASEMOPLUS, PHILOCLEON, AND AFTENOPEDES.
FOR EXPLANATION OF PLATE SEE PAGE 412.